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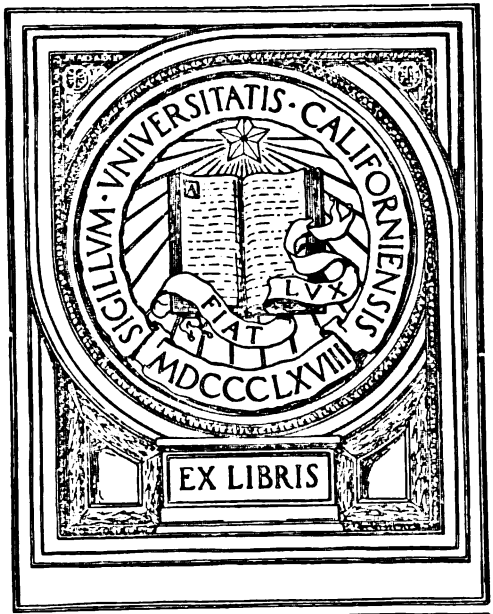

MODERN GEOGRAPHY.

A DESCRIPTION

OF THE

EMPIRES, KINGDOMS, STATES, AND COLONIES;

WITH THE

OCEANS, SEAS, AND ISLES;

IN ALL PARTS OF THE WORLD:

INCLUDING THE MOST RECENT DISCOVERIES,

AND POLITICAL ALTERATIONS.

DIGESTED ON A NEW PLAN,

BY JOHN PINKERTON.

THE ASTRONOMICAL INTRODUCTION

BY THE REV. S. VINCE, A.M. F.R.S.

AND PLUMIAN PROFESSOR OF ASTRONOMY, AND EXPERIMENTAL PHILOSOPHY IN THE UNIVERSITY OF CAMBRIDGE.

WITH NUMEROUS MAPS,

DRAWN UNDER THE DIRECTION, AND WITH THE LATEST IMPROVEMENTS, OF ARROWSMITH, AND ENGRAVED BY THE FIRST AMERICAN ARTISTS.

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PREFACE.

THE importance of geography as a science, and the exuberant variety of knowledge and amusement which it exhibits, are themes too trivial for argument or illustration. Eagerly attached to this study from his early years, the author always cherished a hope that he might contribute his labours to its advancement: For much remained to be done; and many literary men have long admitted, that great advantages might be derived from a new and improved system of modern geography, the latest popular works of this nature not only abounding with numerous and gross mistakes, but being so imperfect in their original plans, that the chief geographical topics have been sacrificed to long details of history, chronology, and commercial regulations, wholly extraneous to the very nature of such a design. When to this it is added, that the most recent and important discoveries are either omitted, imperfectly illustrated, or so defectively arranged as to embarrass and baffle the research of the most patient inquirer, there is no reason to be surprised at the general confession, that such compilations are only used because there is no better extant.

The successive discoveries in the Pacific Ocean, and other parts of the globe, have, within these few years, acquired such a certainty and consistency, that they may

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now be admitted and arranged, in a regular and precise distribution of the parts of the habitable world; while the recent discoveries of La Perouse, Vancouver, and other navigators, nearly complete the exact delineation of the continental shores. No period of time could be more favourable to the appearance of a new system of geography, than the beginning of a new century, after the elapse of the eighteenth, which will be memorable in all ages, from the gigantic progress of every science, and in particular of geographical information; nor less from the surprising changes which have taken place in most countries of Europe, and which of themselves render a new description indispensable. Whole kingdoms have been annihilated; grand provinces transferred; and such a general alteration has taken place in states and boundaries, that a geographical work published five years ago, may be pronounced to be already antiquated.

After a general war of the most eventful description, after revolutions of the most astonishing nature, Europe at length reposes in universal peace. The new divisions and boundaries no longer fluctuate with every campaign, but are established by solemn treaties, which promise to be durable, as at no former period has war appeared more sanguinary or destructive, and at the same time more fruitless even to the victors. These treaties not only influence the descriptions of European countries, but of many in Asia, Africa, and America.

A new system of geography is also specially authorised and authenticated, by the singular advantage of several important books of travels having appeared within these few years, which introduce far more light and precision into our knowledge of many regions. The embassies to China, Tibet, and Ava, for example, present fresh and

authentic materials, without which recourse must have been had to more remote and doubtful information; and the Birman empire is unknown to all systems of geography. The Researches of the Asiatic Society, and other late works, diffuse a new radiance over Hindostan, and the adjacent countries. The labours of the African Society, the travels of Park, Browne, and Barrow, have given more precision to our imperfect knowledge of Africa: and the journies of Hearne and Mackenzie have contributed to disclose the northern boundaries of America. In short, it may be safely affirmed, that more important books of travels and other sources of geographical information, have appeared within these few years, than at any period whatever of literary history.

In this work the essence of innumerable books of travels and voyages will be found to be extracted; and such productions have been the favourite amusements of the most distinguished minds, in all periods and countries, as combining the variety, novelty, and adventure, of poetical and romantic narration, with the study of man, and the benefits of practical instruction. It is unnecessary to repeat the names of Montaigne, Locke, Montesquieu, &c., or that of my late friend Gibbon, whose collection of voyages and travels formed the most chosen part of his library. Why did he not write geography! Why has a Strabo been denied to modern times!

Nor must the rapid advances of natural history be forgotten, which now confer such superior precision on the natural geography of most countries. Not only have zoology and botany received the greatest improvements; but geology and mineralogy have, within these twenty years, become entirely new and grand sciences; the substances being accurately arranged, and described with

such clearness, that throughout the literary world they are exactly known and discriminated.*

Yet even with such advantages, geography is far from being perfect; and the familiar exclamation of D'Anville in his old age may still be adopted: "Ah! my friends, there are many errors in geography†." This science may indeed be regarded as imperfect in its very nature, as no reasonable hope can be entertained that all the habitable lands shall, at any period of time, pass under a trigonometrical survey, the only standard of complete exactness. The chief defects are the interior parts of Africa, and many portions even of the shores; Tibet, and some other central regions of Asia, nay, even Persia, Arabia, and Asiatic Turkey; the western parts of North America; and the Spanish settlements in that part of the new continent; with the central and southern parts of South America. Of New Holland little is known, except the shores: and many discoveries remain to be made in the Pacific Ocean, particularly the extent and interior part of New Guinea, and other large lands in that quarter. Even in Europe the geography of Spain and Portugal is very imperfect, though not so defective as that of European Turkey; nor can we loudly boast while, as Major Rennell informs us, there is no exact chart of the British channel; and the trigonometrical survey, so far as it has extended, has detected gross

* The present system of mineralogy was first established by Bergmann, in 1782, who was followed by Werner, 1789. Mr. Kirwan published an excellent work, 1794, two volumes, 8vo. and in general, within these ten years, this important study, so essential to national wealth and prosperity, has on the new principles been cultivated with surprising ardour and success.

† "*Ah! mes amis, il y a bien des erreurs dans la geographie.*"

errors in the maps of the counties*. We have indeed been more generally attentive to remote regions, than to our native country; and could a new system have been published with more advantages, than in the kingdom which has given birth to the greatest modern discoveries, and improvements in geography?

The rapid progress of science has also, within a like short period, greatly improved the maps and charts of most countries, always to be ranked among the chief objects of geography; though unaccountably the compilers of modern systems seem to write without the inspection of any map whatever, or at least never make any reference of that nature. This is the more surprising, as accurate maps and charts may be said to form the very foundation of geographical knowledge. The author of the present work has been sedulous to discover the latest and best maps of all countries, in which research he has been liberally assisted by our best practical geographers. The small maps which accompany the work are drawn with great care, under the directions and revisions of Mr. Arrowsmith, who is well known by the industry and attention which he employs in selecting the most recent and accurate materials and improvements. The smallness of the size will of course prevent them from supplying the place

* It is a lamentable circumstance that geography is at times retrogressive in some points, while it advances in others. Thus Preston's Survey of the Shetland Islands represents them as one third part too large, both in length and breadth, and there are gross errors in the positions. The mistake was detected in the important voyages ordered by the late king of France; and remedied in the Danish map, Copenhagen, 1787, but still more in that of Capt. Donnelly. These isles now appear nearly as in the maps preceding 1750. Preston's map of these remote British possessions has even occasioned shipwrecks: and the science and capacity necessary for such a survey, ought to be the object of strict previous investigation. Many such instances might be given.

of a large and complete atlas; but they will be found to constitute an useful introduction to such a collection, as they are reduced from the best large maps, and the authorities added at the bottom, while they are illustrated with many important features of the countries, and interesting names, derived from works of natural and civil history, for which a large and extensive atlas may be consulted in vain*. The latter had best be formed by the reader himself, for which purpose a list of the best maps is given at the end of the second volume, affording materials for a selection of the great, of the middle, or of the small kind. To the first class, for example, may be assigned Cassini's map of France in one hundred and eighty-three sheets, Ferrari's map of the Netherlands, and others of a similar extent, more appropriated to public libraries and princely collections. To the second class may be referred maps of kingdoms, from eight or six to four sheets; while an atlas of the smallest size may include those from four to

* A most ingenious artist, considerably imbued with mathematical knowledge, having invented machines which give more clearness and precision to the engraving of straight lines, the author, who had hitherto only seen this method employed in the representation of mathematical instruments, and machinery, was impressed with its peculiar fitness for the delineation of water. With this idea he applied to Mr. Lowry, the inventor, and the effect is now before the public in a series of maps, which may safely be pronounced to be not only unrivalled, but unexampled by any former efforts in this department. Not to mention superior richness and neatness, it is not only singularly adapted to the instruction of youth, by the instantaneous representation of the form and chief bearings of each country, but also facilitates consultation by the marked distinction between land and water, which enables the eye to pass more quickly to the other objects. The consultation of charts might be facilitated in a similar manner, while, in the usual contrast between maps and charts, the sea might be preserved white, and the lands distinguished by strokes, not horizontal, which would resemble water, but vertical. In mineralogical maps, the heraldic mode of engraving might be adopted.

one sheet large folio; under which a collected atlas can be of no utility. Yet even of the latter a wonderful defect may be observed in the best private libraries, where, though a good atlas should form the first object of inquiry and expense, as being useful in reading almost every description of books, yet maps of the most antiquated and erroneous kind often appear; and even the literary investigator is satisfied with finding the name without exploring the fidelity of the general outline, or the accuracy of the positions.

With the advantages above enumerated, of new and important discoveries, of recent and authentic intelligence, and of the particular period of publication, there cannot be any great claim of merit in presenting a more complete system of geography, than has yet appeared in any language: for the Spaniards and Italians have been dormant in this science, the French works of La Croix and others are too brief, while the German compilations of Busching, Fabri, Ebeling, &c. &c., are of a most tremendous prolixity, arranged in the most tasteless manner, and exceeding in dry names, and trifling details, even the minuteness of our Gazetteers*. A description of Europe in fourteen quarto volumes may be well contrasted with Strabo's description of the world in one volume; and geography seems to be that branch of science in which the ancients have established a more classical reputation than the moderns. Every great literary monument may be said to be erected by compilation,

* The Geographical Ephemeris of Zach, (*Allgemeine Geographische Ephemeriden,*) a monthly journal in the German language, embraced astronomy and geography, and has contributed to the advancement of both sciences. It is now conducted by Gaspari and Bertuch, and more strictly confined to geography; while Zach's new journal (*Monatliche Correspondenz*) relates chiefly to astronomy.

from the time of Herodotus to that of Gibbon, and from the age of Homer to that of Shakspeare; but in the use of the materials there is a wide difference between Strabo, Arrian, Ptolemy, Pausanias, Mela, Pliny, and other celebrated ancient names, and modern general geographers; all of whom, except D'Anville, seem under-graduates in literature, without the distinguished talents, or reputation, which have accompanied almost every other literary exertion. Yet it may safely be affirmed that a production of real value in universal geography requires a wider extent of various knowledge than any other literary department, as embracing topics of the most multifarious description. There is however one name, that of D'Anville, peculiarly and justly eminent in this science; but his reputation is chiefly derived from his maps, and from his illustrations of various parts of ancient geography. In special departments Gossellin, and other foreigners have also been recently distinguished; nor is it necessary to remind the reader of the great merit of Rennell and Vincent in our own country.

With such examples, the author confesses his ambitious desire that the present work may, at least, be regarded as more free from defects than any preceding system of modern geography. By the liberality of the publishers no expense has been spared in collecting materials from all quarters; and the assemblage of books and maps would amount to an expense hardly credible. If there be any failure, the blame must solely rest with the author; who being however conversant with the subject, from his early youth, when he was accustomed to draw maps, while engaged in the study of history, and never having neglected his devotion to this important science, he hopes that the ample materials will be found not to

have been entrusted to inadequate hands. He may affirm that the most sedulous attention has been exerted, in the selection and arrangement of the most interesting topics; and he hopes that the novelty of the plan will not only be recommended by greater ease and expedition, in using this work as a book of reference; but by a more strict and classical connection, so as to afford more clear and satisfactory information on a general perusal. The nature and causes of the plan shall be explained in the preliminary observations, as being intimately connected with other topics there investigated. It may here suffice to observe, that the objects most essentially allied with each other, instead of being dispersed as fragments, are here gathered into distinct heads or chapters, arranged in uniform progress, except where particular circumstances commanded a deviation; and instead of pretended histories, and prolix commercial documents, the chief attention is devoted to subjects strictly geographical, but which in preceding systems have often appeared in the form of a mere list of names, the evanescent shades of knowledge. Meagre details of history can be of no service even to youth, and are foreign to the name and nature of geography, which, like chronology, only aspires to illustrate history; and, without encroaching upon other provinces, has more than sufficient difficulties to encounter. The States are arranged according to their comparative importance, as it is proper that the objects which deserve most attention should be treated at the greatest length, and claim the earliest observation of the student.

In the Introduction Professor Vince seems to have omitted nothing in astronomy, or meteorology, that could in the least illustrate geography; and has carefully availed himself of the latest inventions and discoveries. For the

botany of the several countries, this work is indebted to Mr. Arthur Aikin, a zealous and intelligent cultivator of natural history. It may be necessary to remind the unlearned reader, that the Latin names in this part are unavoidable, because plants not known in England, must rarely admit of English appellations.

This work will, it is hoped, shew the progress of geography in every part of the world, to the beginning of the nineteenth century; and when compared with any system, published at the beginning, or even in the middle of the eighteenth, the advances will be found to be prodigious. Many of the early systems were not a little injured in truth and perspicuity, by the mixture of ancient and modern names, even in the maps; an absurdity lately attempted to be revived by some French authors: while in this study the modern state ought always to claim the precedence, because the genuine form of the countries, the windings of the shores, the course of the rivers, the direction of the mountains, and all those parts in which natural geography receives assistance from natural history, are only ascertained by recent observations; and upon this immutable basis, ancient geography must ultimately rest. The modern delineations of many parts of Greece and Asia Minor, have thrown a light upon ancient history, which could never have been derived from theoretic geography, always useless, because it cannot alter the face of nature; and often blameable, as by suppositions of knowledge, it impedes the progress of genuine observation, and patient discovery. In order to delineate the ancient state of a country, it is indispensable that the best modern maps be previously investigated; by which process alone can the sites be accurately determined: and innumerable conjectures of Cluverius, Cellarius, and even D'Anville,

have been overturned by the precision of recent knowledge. Yet the first elements of ancient geography are often instilled into the minds of youth from obsolete maps, in which the most important positions of natural geography, and sometimes even the very points of the compass, are perverted; and from authors, whose most radical opinions have been overturned half a century ago! The proper progress is therefore to begin with the study of modern geography, which may afterwards be followed, with the greatest advantage, by that of the ancient. The opposite course seems almost as ridiculous as it would be to commence the study of botany, by the perusal of Dioscorides, and the Greek and Latin names of plants, without any acquaintance with their genuine characteristics and qualities. In general, genius may be cultivated by the study of ancient authors; but the grounds of any branch of science are to be sought in modern precision.

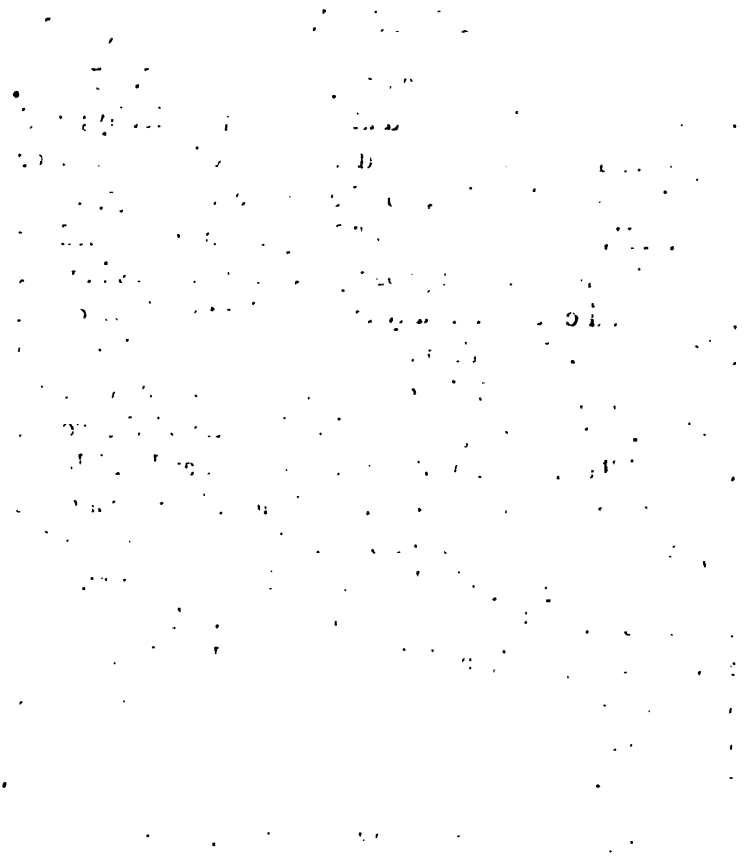
Amidst other advantages already indicated, the regular references to the authorities, here observed for the first time in any geographical system, will be admitted to be a considerable improvement, not only as imparting authenticity to the text, but as enabling the reader to recur to the best original works, when he is desirous of more minute information*. Yet this improvement is so simple that the omission might seem a matter of surprize, were it not that former works of this nature will generally be

* It is also to be wished, that writers on civil and natural history, &c. would, on the mention of places otherwise minute and obscure, indicate the distance and the quarter of the compass, from some well known city, or other object, the bare mention of a name being often insufficient, even for consultation of the largest atlas. This defect often consumes much of the reader's time, which might be saved by the addition of two or three words, with an improvement of the sense, and no injury to the melody of the expression.

found to be blindly copied from preceding systems, with the sole claim of superiority in error, as must happen in such cases, where mistakes multiply, and an old hallucination becomes the father of a numerous progeny. The strict quotation of authorities might also be rather dangerous in erroneous details; and the omission is an convenient, as it is to pass in silence geographical doubts of great importance, which might prove perilous ordeals of science. Accustomed to the labours and pleasures of learning merely for his own mental improvement, as the delight of his ease, the relief of care, the solace of misfortune, the author never hesitates to avow his doubts, or his ignorance; nor scruples to sacrifice the little vanity of the individual to his grand object the advancement of science. An emphatic Arabian proverb declares that *the errors of the learned are learned*; and even the errors of a patient and unbiassed inquirer, may often excite discussion, and a consequent elucidation of the truth. Many blemishes will, no doubt, be found in a work of such an extensive and multifarious nature; but those who are chiefly enabled to detect them, will be the first to pardon. The author can solemnly declare, that, in the few censures which may be here found of some mistakes in other works, he has in no instance been influenced by any motive, except the pure wish of presenting exact information; such a detection of preceding errors being indispensable in a work of instruction. But such passages will be found extremely rare, as he has generally left it to the reader to detect the mistakes of his predecessors, many of which are gross and radical even beyond conception, by a mere collation of their descriptions with those contained in the present work. Should the public favour reward the author's endeavours, he will most sedulously remove any blemishes, and adopt

such real improvements as may be suggested. In the style, he has chiefly aimed at concise perspicuity; and may have frequently sacrificed elegance of ornament, or magnificence of period, to the severe accuracy of the topic. Even the eloquence of Pliny seems oppressed by the prolix minuteness of geography, and struggles in vain, like a grand cataract, nearly arrested by the frost of an alpine winter. Nay, the most decorated and concise of the ancient geographers is constrained to begin with an apology. "I attempt to describe the state of the world, a work full of impediments and difficulties, and which can scarcely be enlivened by one ray of elocution; for a great part will consist of the names of nations and places, with some perplexity even in the order to be followed; and the materials are rather prolix than alluring. The object is nevertheless grand, and important; and aspires to the utmost dignity of science; being, even in unskilful hands, capable of inviting attention, by the contemplation of its magnitude."*

* Pompon. Mela de Situ Orbis, Lib. i. init. Procmii.



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INTRODUCTION.

1. GEOGRAPHY, as it relates to the figure and dimensions of the earth, and the relative situations of places upon its surface, is founded upon the principles of ASTRONOMY; we shall therefore give a full and familiar explanation of such parts of the latter science, as may be necessary for understanding the former; together with such other matters as may be considered a proper introduction to the work.

ON THE FIGURE AND DIMENSIONS OF THE EARTH.

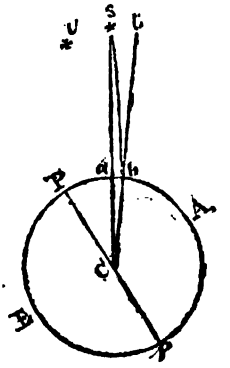
2. The earth is a spherical body, and its figure is very nearly that of a perfect globe, not considering the little unevennesses of its surface arising from hills and valleys, as they bear no more proportion to its magnitude, than the smallest grain of sand does to a common globe. The truth of this is manifest from the following circumstances: 1st, When you stand upon the shore, the spherical form of the sea is manifest to the eye. 2dly, When a ship leaves the shore, and goes out to sea, you first lose sight of the hull, and then of the mast, gradually from the bottom to the top: And when a ship approaches the shore, you first see the top of the mast, and then the lower parts gradually appear, till at last you see the whole ship. Now these appearances would not take place if the sea were a plane; for then every part of the ship would disappear together after leaving the shore, and appear all at once when it approaches the shore; or rather, the hull would disappear last, or appear first, that being the most conspicuous part of the ship, which is contrary to matter of fact. But the appearances are exactly what they ought to be, upon supposition that the sea is spherical, in which case the convexity of the water would produce the phenomena which are observed. 3dly, From the voyages of the navigators MAGELLAN, SIR FRANCIS DRAKE, LORD ANSON, COOK, and many others who have sailed round the earth, having set off in one direction, and continuing their course, have come home in the opposite direction; that is, they have set off east and come home west, or set off west and come home east: this could not have happened if the earth had not been of a globular figure. 4thly, Another proof of the spherical form of the earth, arises from the form of the boundary of its shadow upon the moon in a lunar eclipse, that boundary being always spherical, and nothing but a spherical body can, in all situations, produce a circular shadow. 5thly, If you travel towards the north, many new stars will appear above the horizon in the northern parts, and those in the southern parts near the

horizon will disappear. This can only arise from the spherical form of the earth. In short, all the appearances both upon the earth and in the heavens, are just what they ought to be upon supposition that the earth is globular; but they will none of them answer to that of a plane surface.

3. The globular figure of the earth being thus established, we proceed next to show that the apparent diurnal rotation of all the heavenly bodies arises from the rotation of the earth about one of its diameters, called its *axis*. The apparent diurnal motion of all the heavenly bodies may arise from the rotation of the earth about its axis; or it may be accounted for by supposing the earth to be at rest, and all the bodies daily to perform their revolutions about it. Now, if we suppose the earth to be at rest, all the fixed stars must make a complete revolution every day in parallel circles. But astronomers have very satisfactorily proved, that the nearest of the fixed stars is not less than 400,000 times further from us than the sun is, and that the sun's distance from us is not less than 93 millions of miles. Also, from the discoveries which are every day making by the vast improvement of telescopes, it appears that the heavens are filled with an almost infinite number of stars, whose distances, are, probably, incomparably greater than what we have stated above. But that an almost infinite number of bodies, most of them invisible except by the best telescopes, at almost infinite distances from us and from each other, should have their motions so exactly adjusted as to revolve in the same time, and in parallel circles, and all this without their having any central body, which (as SIR I. NEWTON has proved) is a physical impossibility, is an hypothesis not to be admitted, when we consider that all the phenomena may be solved simply by the rotation of the earth about one of its diameters. If, therefore, we had no other evidence, we might rest satisfied that the apparent diurnal motions of all the heavenly bodies are produced by the earth's rotation. But we have other reasons for this supposition. Experiments prove that all the parts of the earth have a gravitation towards each other. Such a body therefore, the greater part of whose surface is a fluid, must, from the equal gravitation of its parts only, form itself into a sphere. But it appears from mensuration, that the earth is not a perfect sphere, but a spheroid, having its equatorial longer than its polar diameter. Now if we suppose the earth to revolve, the parts most distant from its axis must, from their greater velocity, have a greater tendency to fly off from the axis, and therefore that diameter which is perpendicular to the axis must be increased. That this must be the consequence appears from this experiment, that if you take a thin iron hoop, and make it revolve swiftly about one of its diameters, that diameter will be diminished, and the diameter which is perpendicular to it will be increased. The figure of the earth therefore, which is that of a spheroid flattened a little at the poles, must have arisen from its rotation. Another reason for the earth's rotation, is from analogy. The planets are opaque and spherical bodies, like to our earth; now all the planets, on which sufficient observations have been made to determine the matter, are found to revolve about an axis, and the equatorial diameters of some of them are visibly greater than the polar. When these reasons, all upon different principles, are considered, they amount to a proof of the earth's rotation about its axis, which is as satisfactory to the mind as the most direct demonstration could be. These, however, are not all the proofs that might be offered; the situations and motions of the bodies in our system, necessarily require this motion of the earth. It is no objection to the earth's rotation that we do not per-

ceive it; for we know by experience, that when we are in the cabin of a ship on smooth water, if the ship turn round we do not perceive its motion, and all the fixed bodies on the shore appear to turn in a direction contrary to that of the ship. And in like manner, the earth turning about its axis from west to east, all the heavenly bodies appear to move from east to west. It has also been objected to the earth's rotation, that in such a case, if a ball were thrown perpendicularly upwards, it ought to fall westward of the place from which it was projected. But is to be observed, that when you project the ball upwards, it partakes of the earth's motion, and is carried on with it all the time it is rising, so as to continue directly over the place from which it was projected. This may be exemplified by letting fall a stone from the top of the mast of a ship in motion, for the ball falls as near to the foot of the mast, as it would do if the ship were at rest. Or when you are riding in a carriage, if a ball be let fall from the top, it meets the floor at the point which is directly under that from whence it fell.

4. The magnitude of the earth comes next to be considered; and as the figure of the earth is very nearly that of a perfect sphere, we may, for our present purpose, consider it as such. And here we must premise, that if a sphere be cut through by a plane, the section will be a *circle:* if the plane pass through the centre of the sphere, the section is called a *great* circle; if it do not pass through the centre, it is called a *small* circle. Also, that point of the heavens which is directly over the head of the spectator, is called his *Zenith;* and the opposite point, or that directly under his feet, is called his *Nadir.*



Let $PAp\,E$ represent the earth, C its centre, $P\,C\,p$ the axis about which it turns; then the extremities P, p, are called *Poles;* one, as P, the *north* pole, and the other, p, the *south* pole; and all the great circles, as $PAp\,E$, passing through the poles, are called *Meridians.* Now all circles are supposed to be divided into 360 equal parts, called *degrees;* every degree into 60 equal parts, called *minutes;* and every minute into 60 equal parts, called *seconds;* and degrees, minutes, and seconds, are denoted by these characters, °, ′, ″; thus 37°. 18′. 25″. means, 37 degrees, 18 minutes, 25 seconds. And the angles at the centre of the circle corresponding to the arcs, are called angles of so many degrees, minutes, and seconds. From C draw the right line Ca to a star at s; then the star s is in the zenith of a spectator at a; take $ab = 1°$, and draw Cbt to the heavens at t, then t is the zenith to a spectator at b; also, the angle $a\,C\,b$, or $s\,Ct$ is 1°; join $b\,s$; then because the radius Cb of the earth bears no sensible proportion to the distance Cs of the fixed stars, the angle $s\,b\,t$ will not sensibly differ from the angle $s\,Ct$, or from 1°; therefore to a spectator at b, the star s will be one degree from his zenith t. Let an observer therefore move from a to b, till he finds, from observation, that the star s is 1° from his zenith, and then he knows that he

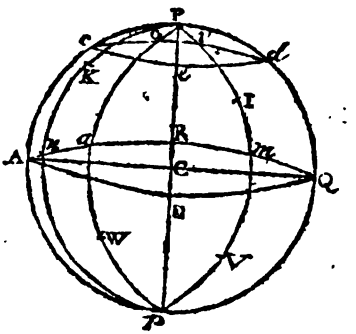
has moved 1° upon the surface of the earth. Let the distance *a b* be measured, and then you get the length of an arc of 1°; and if you multiply that by 360, the product will give you the circumference of the earth. An arc *ab* of any number of degrees may be taken, and then its length being measured, the length of 1 degree may be found by proportion. Or, instead of supposing the star to have been in the zenith of the spectator at *a*, we might have taken a star at *v*, and the difference between the zenith distances of the star *v* at the places *a* and *b*, would have been the same as that of the star *s*; so that when the observer had moved over an arc *ab* of 1°, the zenith distance of the star *v* would have altered 1°. In this manner the length of a degree of a great circle upon the earth's surface has been determined, and thence, its circumference. POSSIDONIUS, who lived in the time of POMPEY the *great*, attempted thus to measure the circumference of the earth; he knew that the star called *Canopus* was in the horizon at *Rhodes*, and that at *Alexandria* its altitude on the meridian was $7\frac{10}{4}$; and the distance between the two places (they being nearly in the same meridian) was 5000 *stadia*; whence he concluded the circumference of the earth to be 240,000 *stadia*. But as the exact value of the *stadia* is not now known, we cannot say how accurate this conclusion is. Our countryman Mr. NORWOOD, in the year 1635, was the first who determined the value of a degree to a considerable accuracy. He took the height of the pole star at *London* and at *York*; and by measuring their distance, he determined the length of a degree to be 69½ miles and 14 poles. After that time, the French academy measured a degree. *Cassini* measured one in *France*; and afterwards *Clairaut*, *Maupertuis*, and several other eminent mathematicians, measured a degree in *Lapland*. The same measurements have been also frequently repeated in various parts of the earth, and the result of the whole is this, that the length of a degree, as you go from the equator to the poles, increases in length. Now the longer a degree is, the greater must be the circle of which it is a part; and the greater the circle is, the less is its curvature. It appears therefore from actual mensuration, that the earth is flatter, or of less curvature, at the poles, than at the equator, agreeable to what we before showed must necessarily be the consequence of the earth's rotation. The length of a degree in latitude 45° is 69,2 English miles, and this we may consider as a *mean* length; hence, 69,2 × 360 = 24912 miles, the circumference of the earth; and as the circumference of every circle is to its radius as 6,28318 to 1, we have, 6,28318 : 1 : : 24912 : 3965 miles, the radius of the earth. DR. LONG estimated the proportion of land to water upon the surface of the earth, so far as discoveries had then been made, in the following manner. He took the paper off a terrestrial globe, and then cut out the land from the sea, and weighed the two parts; by this means he found the proportion of the land to the sea as 124 : 349. The conclusion would be more accurate, if the land were cut from the sea *before* the paper was put upon the globe. After all the modern discoveries, this method would probably give the proportion of land to water, to a considerable degree of accuracy.

5. We have already observed, that the earth is not a perfect sphere but a spheroid, having the polar diameter shorter than the equatorial; and the ratio of these diameters has been determined by different methods. If the length of a degree at two places be found by mensuration, that *datum* is sufficient to find the ratio; but the ratio thus determined, by taking different measurements, differs considerably. MR. VINCE, in his *Complete System of Astronomy*, vol. ii. page 99, has determined the ratio from a great many comparisons; and it will be found that they differ considerably; but the

mean of the whole gives the ratio of 177: 178 for the proportion of the polar to the equatorial diameter of the earth. SIR I. NEWTON, from the principles of gravitation, makes the ratio 229: 230; and some authors have deduced a mean ratio from mensuration, which agrees very nearly with this. The length of a pendulum vibrating seconds, increases as you carry it towards the poles; and this ought to take place in consequence of the spheroidical figure of the earth, as before determined, and affords another proof of that figure. And if the length of a pendulum vibrating seconds in two latitudes could be accurately ascertained, we might find the ratio of the diameters of the earth, the density of the earth being supposed uniform. But the ratios thus deduced from different observations, differ considerably; owing, probably, to the irregularity of the density of the interior parts of the earth. M. CLAIRAUT observes, that the variations of the lengths of pendulums make the ratio of the diameters nearer that of equality than 229: 230, indicating a greater density towards the centre. It has been also proposed to find the ratio of the diameters of the earth, from solar eclipses, as the computation of the parallax of the moon, and consequently the times of the beginning and end of such eclipses, will vary, according as the ratio of the diameters of the earth vary. M. de la LANDE from hence makes the difference of the diameters to be $\frac{1}{300}$ of the whole. From a consideration of all the circumstances, it is probable that the difference of the polar and equatorial diameters is less than that which is determined by SIR I. NEWTON. If we take the ratio of the diameters as determined by him, the equatorial diameter will be found to exceed the polar, by about 34 miles.

6. It appears by calculation, that when the eye of a spectator is six feet above the surface of the sea, he can see three miles; and at any other altitude of the eye, the distance at which you can see, varies as the square root of the altitude; if therefore a be the altitude of the eye in feet, and d the distance in miles, which you can see at that altitude, then $\sqrt{6} : \sqrt{a} :: 3 : d = \frac{3\sqrt{a}}{\sqrt{6}} \times = 1{,}2247 \times \sqrt{a}$; hence, we have this rule: *Multiply the square root of the height of the eye in feet, by* 1,2247, *and the product is the distance to which you can see in miles.* For example; if the height of the eye be 25 feet, then the square of 25 is 5, and if you multiply 1,2247 by 5, the product is 6,1235 miles, the distance to which the eye can see.

ON THE LATITUDE AND LONGITUDE OF PLACES UPON THE EARTH'S SURFACE.



7. Let $PApQ$ represent the earth, PCp its axis, P the north pole, p the south pole; and let $AEQR$ be a circle passing through the centre C, perpendicular to the axis Pp, then that circle is called the *equator*. This circle divides the earth into two equal parts, APQ called the *northern*, and ApQ called the *southern hemisphere*. Let K, G, I, be the situations of three places upon the surface, and through them draw the great circles PKp, PGp, PIp, called *meridians*, intersecting the equator in n, a, m, respectively. Now as every circle is supposed to be divided into 360 degrees, from the pole to the equator must be 90 degrees. The *latitude*

of a place, is *an arc of its meridian intercepted between the place and the equator, measured in degrees.* Hence, the latitude of *K* is measured by the degrees of the arc *n K;* and the latitudes of *G* and *I* are measured by the degrees of the arcs a G, m I, respectively, and these are called *north* latitudes, the places lying in the northern hemisphere; and the latitude of *W* is measured by the degrees of the arc *a W*, and is called *south* latitude, the place lying in the southern hemisphere. Let the small circle *cGvde* be parallel to the equator, then this circle is called a *parallel of latitude*, because every point of it has the same latitude, all the arcs *mv*, *aG*, intercepted between it and the equator, being equal, on account of the circles being parallel. The *longitude* of a place is measured upon the equator, and is the arc intercepted between the point from which you begin to reckon, and the point where the meridian of the place cuts the equator, estimated in degrees. Hence, all places in the *same* meridian have the *same* longitude; the longitude of *G* is the same as the longitude of *W*. Geographers of different countries begin to reckon from different points, each beginning from that point where the meridian of its capital city cuts the equator; and if the city have a national observatory in or very near to it, that meridian is taken which passes through the observatory. This is called the *first* meridian. We may therefore define the *longitude* of a place to be *an arc of the equator intercepted between the first meridian and the meridian passing through the place.* In *England* therefore we begin from that meridian which passes through the observatory at *Greenwich;* in *France*, they begin from that meridian which passes through the observatory at *Paris*. Let therefore *G* represent the royal observatory at *Greenwich*, and *a* is the point of the equator from which we begin to reckon the longitude. Hence, the degrees of the arc *am* is the longitude of the place *I;* and the longitude of the place *K* is measured by the degrees of the arc *an*. Now the direction *am* from *a* is east, and the direction *an* is west; it is therefore usual to call *am east* longitude, and *an west* longitude, each till you come to the point opposite to *a*, or till the longitude each way becomes 180 degrees. But sometimes the longitude is reckoned all the way round in the same direction; that is, the point *m*, wherever it may be, is called east longitude from *a*.

8. If the latitude and longitude of a place be given, the place itself may be found; for if the longitude be known, set off the arc *am* equal to it, if it be east longitude, and draw the meridian *Pmp*; then if the latitude be north, set off *mI* equal to it, and *I* is the place required; but if the latitude be south, set off *mV* equal to it, and V is the place. If the longitude be west, set off *an* equal to it, and take *aG*, or *aW* equal to the latitude, according as it is north or south, and *G*, or *W*, will be the place. Thus, all the places upon the surface of the earth, whose latitudes and longitudes are known, may be laid down accurately upon a globe; and the boundaries of the different countries may be traced out, and each exhibited in its proper situation and figure. By means of a globe therefore you may get a perfect idea of the relative magnitudes, figures, and situations of all the countries of the earth, and of the situations of all the principal places in them; but a map, being a plane surface, cannot correctly represent the proportions, boundaries, and positions of the places. The determination of the latitude and longitude is therefore essential to geography, and consequently to navigation; the methods by which these are found, we shall afterwards fully explain.

9. The arc *Gv* contains the same number of degrees as the arc *am*; the degrees of longitude therefore between any two places, when measured upon a small circle parallel

to the equator, diminish as that circle approaches the pole. The arc *am* contains the same number of degrees as the angle *aPm*; hence, the angle formed by the meridians passing through any two places, is the measure of the difference of the longitudes of those places.

10. The following Table contains the length of a degree of longitude in English *miles* for every degree of latitude.

Lat.	D. of Lon.	Lat.	D. of Lon.	Lat.	D. of Lon.	Lat.	D. of Lon.
0°	69,2000	23°	63,6986	46°	48,0705	68°	25,9230
1	69,1896	24	63,2177	47	47,1944	69	24,7992
2	69,1578	25	62,7167	48	46,3038	70	23,6678
3	69,1052	26	62,1963	49	45,3994	71	22,5294
4	69,0312	27	61,6579	50	44,4811	72	21,3842
5	68,9363	28	61,1001	51	43,5489	73	20,2320
6	68,8208	29	60,5237	52	42,6037	74	19,0743
7	68,6845	30	59,9293	53	41,6453	75	17,9103
8	68,5267	31	59,3162	54	40,6751	76	16,7409
9	68,3481	32	58,6851	55	39,6917	77	15,5665
10	68,1489	33	58,0360	56	38,6959	78	14,3874
11	67,9288	34	57,3696	57	37,6891	79	13,2041
12	67,6880	35	56,6852	58	36,6705	80	12,0166
13	67,4264	36	55,9842	59	35,6408	81	10,8250
14	67,1448	37	55,2659	60	34,6000	82	9,6306
15	66,8424	38	54,5303	61	33,5489	83	8,4334
16	66,5192	39	53,7788	62	32,4873	84	7,2335
17	66,1760	40	53,0100	63	31,4161	85	6,0315
18	65,8134	41	52,2259	64	30,3352	86	4,8274
19	65,4300	42	51,4253	65	29,2453	87	3,6219
20	65,0265	43	50,6094	66	28,1464	88	2,4151
21	64,6037	44	49,7783	67	27,0385	89	1,2075
22	64,1609	45	48,9313				

ON THE ATMOSPHERE OF THE EARTH.

11. The earth is surrounded with a thin, invisible, elastic fluid, called *air*, the whole body of which forms what is called the *atmosphere*. It being an elastic fluid, is capable of compression; on which account, the lower parts of the atmosphere are denser than the upper parts, and the density gradually diminishes, the higher you go, from the continual diminution of compression; for the air being found to have weight, as you ascend, the weight of the incumbent air will be diminished. The density of the air is not always the same, it being subject to be expanded by heat, and contracted by cold. In its mean state it is found to be about 850 times lighter than water. But notwithstanding the air is so extremely rare, it is capable of producing very considerable effects upon the rays of light as they pass through it, both by reflection and refraction. By reflection, the rays coming from the sun falling on the particles of air, and upon the vapours and exhalations contained in the atmosphere, are thrown in all directions, and thus the whole heavens become illuminated; by which our eyes are affected so strongly, as to render the fainter light of the stars insensible. Whereas, if there were no atmosphere, we should receive only those rays which come directly to us, and the other parts of the heavens would appear dark, and the stars would all be visible as at night. From the same cause we receive a

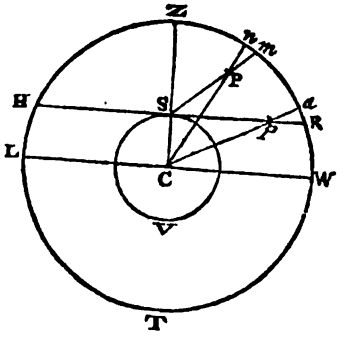
considerable quantity of light for some time before the sun rises, and after he sets; this is called *twilight*; and were it not for this, we should be involved in total darkness, the instant after the sun is set; and there would be a sudden transition from darkness to light, at the rising of the sun, which would be extremely prejudicial to the eyes. From the time at which twilight begins and ends, the beginning and end are found to be when the sun is about 18° below the horizon. It lasts however till the sun is further below the horizon in the evening than he is in the morning when he begins; it also lasts longer in summer than in winter. In the *former* case, the heat of the day has raised the vapours and exhalations; and in the *latter*, they will be more elevated from the heat of the season; and therefore the twilight ought to be longer in the evening than in the morning: and longer in winter than in summer.

12. Another property of the atmosphere is that of refracting the rays of light, by which means the heavenly bodies appear out of their true places. It is a principle of optics, that when a ray of light passes out of a denser into a rarer medium, it is bent *towards* the perpendicular to the surface of the medium at the point where it enters. A ray of light therefore coming from any of the heavenly bodies, when it enters the top of the atmosphere will be bent from its rectilinear course, towards a radius drawn to the earth's centre, because the radius is perpendicular to the surface of the atmosphere; and as, in approaching the earth's surface, the density of the atmosphere continually increases, the rays of light, as they descend, are constantly entering a denser medium, and therefore the course of the ray will continually deviate from a right line towards a radius drawn to the earth's centre and describe a curve; hence, at the surface of the earth the rays of light enter the eye of the spectator in a different direction from what they would have entered, if there had been no atmosphere; therefore the *apparent* place of the body from which the light comes must be different from the *true* place; and as the course of the ray has been continually approaching to a radius drawn to the centre of the earth, its direction, when it comes to the surface of the earth, must be inclined from its original direction towards the zenith; therefore the *apparent* place of the body is *higher* than its *true* place. The ancients were not unacquainted with this effect: *Ptolemy* mentions a difference in the rising and setting of the stars in different states of the atmosphere; but he made no allowance for it in his computations. ALHAZEN, an Arabian optician in the eleventh century, observed the effect upon the circumpolar stars; but TYCHO was the first person who constructed a table for the refractions at different altitudes, for the refraction decreases from the horizon to the zenith, where it is nothing. In the mean state of our air, the refraction in the horizon is 33′.

13. Another property of the refraction of the air is this, that it causes all the heavenly bodies to appear in the morning above the horizon, when they are actually below it; and in the evening they appear above, a little after they are actually set; for the diameter of the sun being about 32′, the refraction in the horizon elevating it 33′, will cause it to appear above the horizon when the whole body is below. In climates nearer the equator, the refraction is less than it is here; and in colder regions it is much greater, and this is a happy provision for lengthening the appearance of the light at those parts. GASSENDUS relates, that some *Hollanders* who wintered in *Nova Zembla*, in latitude 75°, were agreeably surprised with the sight of the sun 17 days before they expected him. To the same cause we must attribute another phenomenon, mentioned by PLINY, that the moon had been visibly eclipsed when she was in the west, at the same time that

the sun appeared above the horizon in the east. MÆSTLINUS, in KEPLER, relates another instance of the same kind which fell under his own observation. Also, the decrease of refraction, as the altitude above the horizon increases, makes the sun and moon appear of an oval form, more particularly in the horizon. For suppose the diameter of the sun to be 32′, and the lower limb to touch the horizon, then the mean refraction of that limb is 33′; but the altitude of the upper limb being then 32′, its refraction is only 28′ 6″, differing 4′ 54″, from the refraction of the lower limb; by this quantity therefore the vertical diameter is shortened, the lower limb being so much more elevated than the upper. The like is true at any other altitude, only in a smallar degree.

observed from the earth's centre and surface, they would be referred to different places amongst the fixed stars, and the distance of those places is called the *diurnal* parallax, and this is what we have now occasion to consider.



ON PARALLAX.

14. When you refer an object to something behind it, it will not appear in the same situation to two spectators situated at different places, unless the object be at an almost indefinitely great distance when compared with the distance of the two spectators; and the distance of these apparent places is called the *parallax* of that object. From the immense distance of the fixed stars therefore in respect to the diameter of the earth's orbit, they never appear to change their relative situations; on which account we may consider them as a back-ground to which we may refer all the bodies in our system; and we may consider them as placed in the concave surface of a sphere, of which the earth is the centre. If therefore a planet, when it is in the same part of its orbit, be viewed from the two extremities of a diameter of the earth's orbit, it will appear in two different places amongst the fixed stars; and the distance between these two places is called the *annual* parallax..... In like manner, if a planet, or any of the bodies in our system, were

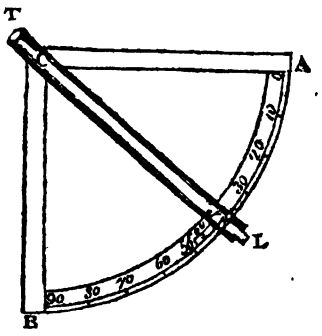
Let *C* be the centre of the earth *SV*, *S* the place of a spectator, *Z* his zenith; and conceive the circle *ZT* to represent the sphere of the fixed stars, and let *HSR* be a plane touching the earth at *S*, then that plane is called the *sensible horizon*; it dividing the visible part *HZR* of the heavens from the invisible part *HTR*. If a plane *LCW* be drawn through the centre of the earth, parallel to *HZR*, it is called the *rational* horizon. Now the arc *RW* amongst the fixed stars subtends no sensible angle at the earth, and hence we may suppose the two horizons there to coincide. Let *P* be a planet; and draw *CPn*, *Spm*; then the planet seen from *S* appears at *m*, and from *C* it would appear at *n*, and *nm* is called the *diurnal* parallax; because at different parts of the day, when the planet is at different altitudes, the arc *mn* will be different. If the planet be in the horizon at *p*, and we draw *Cpa*, then *Ra* is the horizontal parallax, which is the greatest of all; and from the horizon to the zenith it gradually decreases, and is nothing in the zenith. Also, the nearer a planet is to the earth, the greater is its parallax; for the nearer *P* is

to *C*, the greater is the angle *CPS*, or *nPm*, which is the parallax, as that angle is measured by the arc *mn*. Now astronomers refer all their observations to the centre of the earth, and consider the place as seen from thence, to be the *true* place; therefore the *apparent* place *m* seen from the surface is *below* the *true* place *n*. Hence, after an altitude is taken upon the surface of the earth, we must *add* the parallax corresponding to that altitude, in order to obtain the *true* altitude, or the altitude seen from the centre of the earth, above the rational horizon. If we know the parallax of a body, we know its distance; for suppose we know the horizontal parallax *SpC*, then by plane trigonometry, sin. *SpC*: radius:: *ZC*: *Cp*; thus we get the distance *Cp* in terms of the radius of the earth.

15. It follows therefore from what we have observed (art. 12 14) that after the altitude of an heavenly body is found by observation, it will want two corrections, one for refraction, and the other for parallax; the former to be subtracted, and the latter to be added. Thus you reduce the *observed* to the *true* altitude. As the fixed stars have no parallax, the only correction there necessary is that for refraction.

16. As the altitudes of the heavenly bodies are determined by an instrument called a *quadrant*, it may be here proper to give a general description of it.

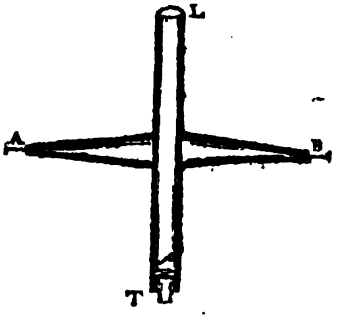
ON THE ASTRONOMICAL QUADRANT.



17. Let *C* represent the centre of the quadrant, *CA*, *CB* two radii perpendicular to each other, thereby including an arc *AB* of 90 degrees; TL is a Telescope moveable about the centre *C*; in the principal focus *f* of the object glass, there are fixed two fine wires at right angles to each other, intersecting each other in the centre of the telescope; one of these wires is adjusted parallel to the horizon, and consequently the other will be perpendicular to it; the line joining the intersection of these wires, and the centre of the object glass, is called the *axis* of the telescope, and sometimes the *line of collimation*. The telescope moves against the limb of the quadrant, and carries with it a small graduated piece of brass *rv*, called a *vernier*, having a

mark at *o* pointing to the divisions of the limb. This point *o* is so adjusted, that when it is set to point to *o* on the limb, the axis of the telescope is horizontal, and therefore an object in the horizon will appear upon the horizontal wire. When therefore the telescope is put into any other situation, and an object brought upon the horizontal wire, the point *o* of the vernier will be directed to a point of the limb which shows how many degrees high the object is above the horizon. The limb is generally divided into degrees, and each degree into three equal parts, by which the whole limb is divided into every 20 minutes. The vernier has also a certain number of divisions upon it, so that by observing which two divisions of the vernier and limb coincide, you can tell to what minute of the limb the mark *o* of the vernier is directed, and therefore know the altitude of the object above the horizon, in degrees and minutes. If no two divisions should coincide, there is another apparatus prefixed to the telescope at the limb of the quadrant, by which you can tell to a second, the point of the limb against which *o* on the vernier stands: and thus you can ascertain the altitude of an object to a second. For a full explanation of these matters we refer the reader to MR. VINCE'S *Treatise on Practical Astronomy*. This instrument is sometimes fixed to a perpendicular axis, and can be placed in any situation, so that the altitudes of any of the heavenly bodies, can be determined by it. Sometimes it is fixed against a very firm stone wall, having its plane exactly in the meridian, so that only meridian altitudes can be taken by it. This is called a *mural* quadrant; and all very large quadrants are thus fixed up; for the most accurate observations which astronomers want, are those upon the meridian, by which (as will be afterwards shown) the *declinations* of the heavenly bodies may be found. After the altitude is taken, it must (art. 15) be corrected by subtracting the refraction and adding the parallax, by which we get the true altitude of the object above the rational horizon corresponding to the place of the observer.

ON THE TRANSIT TELESCOPE.

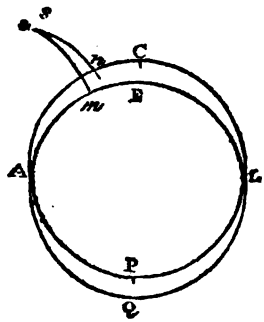


18. A transit Telescope is a telescope moveable about an horizontal axis, and so adjusted, that its axis may move exactly in the plane of the meridian. The annexed figure represents this instrument; TL represents the telescope, AB the axis about which it turns, each end of which is made cylindrical; these ends are each laid in an angular notch cut in a piece of brass; and each of these pieces of brass is moveable in a brass frame fixed in firm stone pillars; each piece is moved by a screw; that at one end acts against the under side of one of the brass pieces, and gives that end of the axis AB of the telescope, a motion *perpendicular* to the horizon; and the other screw acts against one of the sides of the other brass piece, and gives the axis AB a motion *parallel* to the horizon; by means of these two screws therefore the telescope can be brought into any position. In the focus *f* of the object glass there are fixed two fine wires perpendicular to each other, and the line joining their intersection and the centre of the object glass, is called the *axis* of the tube

TL, or the *line of collimation* of the telescope. One of these wires is adjusted perpendicularly to the horizon, and of course the other will then be parallel to it. After all the adjustments of this instrument are made, if the instrument be turned about the axis AB, the perpendicular wire moves exactly in the plane of the meridian; so that when any object comes to this wire, by means of a clock properly regulated, you get the time of its passage over the meridian. Sometimes there are fixed one or two more perpendicular wires, equidistant from this middle perpendicular wire. For an explanation of the methods of making these adjustments, we must refer to the work before mentioned. This instrument is used to find the *right ascensions* of the heavenly bodies, as we shall afterwards explain.

EXPLANATION OF TERMS.

19. Having mentioned the *declination* and *right ascension* of the heavenly bodies, we will, before we proceed, explain these and some other terms, which we shall have occasion to make use of. We have already explained the *equator* of the *earth*; and if the plane of this circle be extended as far as the fixed stars, it will there mark out a circle which is called the *celestial* equator; and if the axis of the earth be extended to the heavens the two points marked out by it are called the *poles*, or the *celestial* equator. Thus the heavens are divided into *northern* and *southern* hemispheres, corresponding to those on the earth. Now in the course of a year, the sun appears to describe a great circle in the sphere of the fixed stars, called the *ecliptic*; this apparent motion of the sun arises from the real motion of the earth about the sun in the space of a year; it is therefore, in fact, the earth that describes the ecliptic. The equator and the ecliptic do not coincide, but are inclined to each other at an angle of about 23° 28′, cutting each other at two opposite points, called the *equinoxes*; and this angle is called the *obliquity of the ecliptic*.



Let *AELQ* represent the celestial equator, *ACLP* the ecliptic, inclined to, and cutting each other in opposite points *A*, *L*, for all great circles divide each other into two equal parts. The ecliptic is divided into 12 equal parts, called *signs*; *aries* ♈, *taurus* ♉, *gemini* ♊, *cancer* ♋, *leo* ♌, *virgo* ♍, *libra* ♎, *scorpio* ♏, *sagittarius* ♐, *capricornus* ♑, *aquarius* ♒, *pisces* ♓. The order of these is according to the apparent motion of the sun. The first point of aries coincides with one of the equinoxes, as A, and consequently the first point of libra coincides with the other equinox L. The first six signs are called *northern*, lying on the *north* side of the equator; and the last six are called *southern*, lying on the *south* side. When the motion of the heavenly bodies is according to the order of the signs, it is called *direct*, and when the motion is in a contrary direction, it is called *retrograde*. The *real* motion of all the planets is according to the order of the signs, but their *apparent* motion is sometimes in a contrary direction, for reasons which will afterwards appear. The equinoctial points A, L, are not fixed, but have a retrograde motion of about 50″ in a year; this is called the *proces-*

sion of the equinoxes. The *zodiac* is a space extending 8° on each side of the ecliptic, within which the motions of all the planets are performed.

20. If *s* be the place of a star, and *sm* be a great circle perpendicular to the equator, then *Am* is called the *right ascension* of the star, and *sm* is called its *declination.*

If *sn* be a great circle perpendicular to the ecliptic, then *An* is called the *longitude* of the star, and *sn* is called its *latitude.* If therefore we know the right ascension *Am*, and declination *ms* of an heavenly body, we know its place *s*; or if we know its longitude *An*, and latitude *ns*, its place is known. If half the ecliptic *ACP* be bisected in *C*, and the other half in *P*, then *C* and *P* are the beginnings of cancer and capricorn, and these are called *tropical* points. Two small circles drawn through these two points, parallel to the equator, are called *tropics*; that passing through *C* is called the tropic of cancer, and that through *P*, the tropic of capricorn.

21. A body is in *conjunction* with the sun, when it has the same longitude; and in *opposition*, when the difference of their longitude is 180°.

22. The *elongation* of a body is its angular distance from the sun, when seen from the earth.

23. The *antipodes* to a spectator upon the earth's surface, is that point upon the surface which is diametrically opposite to him.

24. If a body in the heavens be referred to the horizon by a vertical circle, by drawing a vertical circle through it, the distance of that point of the horizon from the north or south points, is called its *azimuth*; and the distance from the east or west points, is called its *amplitude.* These four points are called the *cardinal* points.

25. The *primary* planets are those which revolve about the sun; and the *secondary* planets are those which revolve about the primary, and these are also called *satellites*, or *moons.*

26. The *nodes* are the points where the orbits of the primary planets cut the ecliptic; and where the orbits of the secondary planets cut the orbits of their primaries. That node is called *ascending*, where the planet passes from the south to the north side of the ecliptic, and is marked thus, ☊; the other node is called *descending*, and is marked thus, ☋.

27. The *aphelion* is that point in the orbit of a planet which is the furthest from the sun; and the *perihelion* is that point which is nearest to the sun.

28. The *apogee* is that point of the earth's orbit which is furthest from the sun, or that point of the moon's orbit which is furthest from the earth; and the *perigee* is that point of each orbit which is nearest to the sun, or earth.

29. The *apsis* of an orbit is either its apogee or perigee, aphelion or perihelion.

30. A *sidereal* day is the interval between two successive passages of the same fixed star, over the meridian. These days are all equal.

31. A *solar* day is the interval between two successive passages of the sun over the meridian. These days are unequal, on account of the unequal motion of the sun in right ascension. If therefore we compare a clock with the sun, and adjust it to go 24 hours from the time the sun leaves the meridian on any day, till it returns to it the next day, the clock will not continue to agree with the sun, that is, it will not continue to show 12 when the sun comes to the meridian; as will afterwards more fully appear.

32. *Apparent* noon is the time when the sun comes to the meridian; *true*, or *mean* noon is 12 o'clock, by a watch adjusted to go 24 hours in a *mean* solar day. And the difference between *apparent* and *mean* noon is the *equation of time.*

33. A star is said to rise or set *cosmically*, when it rises or sets at sun rising; and when it rises or sets at sun setting, it is said to rise or set *achronically*.

34. A star is said to rise *heliacally*, when, after having been so near to the sun as not to be visible, it emerges out of the sun's rays, and just appears in the morning; and it is said to set *heliacally*, when the sun approaches so near to it, that it is about to immerge into the sun's rays, and to become invisible in the evening.

35. A *digit* is a twelfth part of the diameter of the sun or moon.

36. A *constellation* is a collection of stars contained within some assumed figure, as a *ram*, a *dragon*, an *Hercules*, &c. The whole heavens is thus divided into constellations.

37. If an eye be in the plane of a circle, that circle appears a straight line; therefore in the representation of the circles of a sphere upon a plane surface, those circles, whose planes pass through the eye, are represented by straight lines.

38. Characters usud for the sun, moon, and planets.

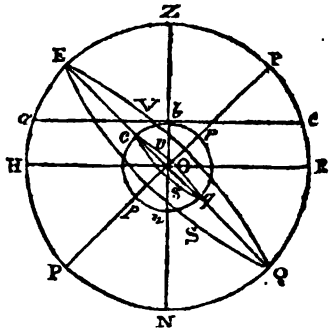
☉ the Sun	♂ Mars
☽ the Moon	♃ Jupiter
☿ Mercury	♄ Saturn
♀ Venus	♅ Georgian
⊖ the Earth	

Characters used for the days of the week.

☉ Sunday	♃ Thursday
☽ Monday	♀ Friday
♂ Tuesday	♄ Saturday.
☿ Wednesday	

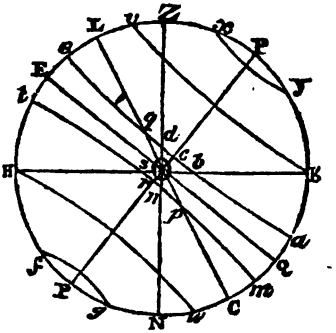
ON THE DOCTRINE OF THE SPHERE.

39. A spectator upon the surface of the earth, conceives himself to be placed in the centre of a concave sphere, in which all the heavenly bodies are situated; and by constantly observing them, he perceives that far the greater number of them never change their relative situations, each rising and setting at the same interval of time, and at the same points of the horizon, and are therefore called *fixed* stars; but he finds that a few others, called *planets*, together with the *sun* and *moon*, are constantly changing their situations, each continually rising and setting at different points of the horizon, and at different intervals of time. Now the determination of the times of the rising and setting of the heavenly bodies; the finding of their position at any given time, or the time from their position; the causes of the different lengths of days and nights; the changes of seasons; and the like, constitute what is called the *doctrine of the sphere*.



40. Let *pefq* represent the earth, *b* the place of the spectator, *HZRN* the sphere of the fixed stars; and although the fixed stars do not lie in the concave surface of a sphere, of which the centre of the earth is the centre, yet on account of the immense distance, even of the nearest of them, their relative situations are not at all affected by the motion of the earth, and therefore the place of a body in our system may be referred to them, in the same manner as if they were placed as is here supposed. Now the circle *pbefq* is the meridian of the spectator at *b*, and let this circle be extended to the heavens and there mark out the circle *PZEP'Q*, and

it will be the celestial meridian of the place; whenever therefore a body in the heavens comes to this circle, it is in the meridian of the spectator *b*; and this circle divides the heavens into two hemispheres, the *eastern* and the *western*. Let *abo* be a plane touching the earth at the place *b* of the spectator, then this plane will be his *sensible* horizon, because it divides the visible part *aZo* of the heavens, from the invisible part *aNo*; and if a plane HR be drawn through the centre of the earth, parallel to *abo*, it is called the *rational* horizon; and as the arc *Ro* subtends no sensible angle at the earth, these planes, in respect to the sphere of the fixed stars, may be considered as coinciding. Now as the earth revolves daily about its axis, the heavenly bodies must successively rise and set in that time, and appear to describe circles which are perpendicular to the earth's axis, and consequently parallel to each other. Let *pp'* be the axis of the earth, *p'* the north pole, *p'* the south pole; and let *evqs* be the equator; then if the plane of the equator be extended up to the heavens, it will there mark out a circle *EVQS* called the celestial equator; and if *pp'* be produced to the heavens to *P*, *P'*, these points are called the poles of the celestial equator; and the star nearest to these is called the *pole* star. Now, although the earth in its orbit continually changes its place, yet as the axis always continues parallel to itself*, the points *P*, *P'*, will not, from the immense distance of the fixed stars, be sensibly altered. Let *n* be the antipodes to *b*, then if the diameter *bn* be produced to *Z* and *N*, *Z* is the zenith of the spectator, and *N* the nadir. Thus we may conceive the great circles, and any places upon the earth's surface, to be transferred to the heavens. Now the latitude of the place *b* upon the earth's surface is measured by the degrees of the arc *be*; but the arc *ZE* contains the same number of degrees as the arc *be*, therefore the arc *ZE* in the heavens measures the latitude of *b* the spectator; and the degrees of the arc *bp*, which measures the distance of the spectator from the pole, contains the same number of degrees as the arc *ZP*. Hence, as the equator, zenith, poles, and horizon in the heavens, may be considered as corresponding to the equator, place of the spectator, poles, and horizon of the earth, and the angular distances of the former are respectively equal to those of the latter, we may, for our present purpose, leave out the consideration of the earth, and only consider the equator, zenith, poles, and horizon of the heavens.



41. Let therefore *PZEHP'NQR* represent the celestial meridian to the place of a spectator upon the earth whose zenith is *Z*, the spectator being supposed in *north* latitude; and let the figure represent either the eastern or western hemisphere of the heavens; we must therefore conceive this figure to represent half a globe, and all the lines upon it to represent circles; and as, if we conceive the eye to be vertical to the middle point O of the figure, all the circles which pass through that point will appear right lines, there-

* This is not accurately true, the earth's axis varying a little from its parallelism from the attraction of the moon. This is called the *mutation* of the earth's axis, and was discovered by Dr. Bradley.

fore the right lines *ZON*, *POP'*, *EOQ*, *HOR*, must be considered as semicircles, *HOR* representing the horizon, *EOQ* the equator, *ZON* a vertical circle passing through the zenith and nadir, perpendicular to the horizon, and this is called the *prime vertical*, cutting the horizon in *O* the east or west point of the horizon, according as the figure represents the eastern or western hemisphere. For the spectator being supposed to be at *Z*, and looking along the meridian *ZPR* towards the north pole *P*, *R* must be the north point of the horizon, and consequently the opposite point *H* will be the south point; and as the point *O* bisects the points *H*, *R*, it must represent the east or west point. All these circles are great circles, their planes passing through the centre of the sphere. Draw the small circles *wH*, *mt*, *ae*, *Rv* parallel to the equator. Now the semicircle *POP'* bisects the semicircle *EOQ* in *O*, and therefore it bisects the semicircle *ae*, *mt*, in *c* and *r*. Now the ecliptic, or that circle which the sun appears to describe in a year, cuts the equator at an angle of 23°. 28′; let therefore the circle *COL* cut the circle *EOQ* in that angle, and *COL* will represent the ecliptic.

42. Now as all the heavenly bodies, in their apparent diurnal motion, describe either the equator, or small circles parallel to the equator, according as the body is in or out of the equator, if we conceive the figure to represent the eastern hemisphere, *QE*, *ae*, *mt*, may represent their apparent paths as they move from the meridian under the horizon till they come to the meridian above the horizon, and the points *O*, *b*, *s*, are the points of the horizon where they rise. Now *ae*, *QE*, *mt*, are bisected in *c*, *O*, *r*; therefore *cb*, the part above the horizon is greater than *ab* the part below; *EO* the part above is equal to *OQ* the part below; and *ts* the part above is less than *sm* the part below; and as *Z* represents the place of the spectator, it follows, that those heavenly bodies which are on the *same* side of the equator as the spectator, will be *longer* above the horizon than below; those bodies which are *in* the equator, are *as long* above the horizon as below; and those bodies which are on the *opposite* side of the equator to that of the spectator, will be a *shorter* time above the horizon than below. Also, the bodies describing *ae*, *QE*, *mt*, rise at *b*, *O*, *s*; that is, a body which is on the *same* side of the equator with the spectator, rises at *b*, from the east point *O* towards the north point *R* of the horizon; a body which is *in* the equator, rises at *O* in the east; and those bodies which are on the *opposite* side of the equator to the spectator, rises at *s*, from the east point *O* towards the south point *H*. When the bodies come to *O*, *d* or *n*, they are in the prime vertical, or in the east; hence, a body on the *same* side of the equator with the spectator, comes to the east *after* it is risen; a body on the *contrary* side, *before* it rises; and a body *in* the equator, when it rises. As this figure may represent the western hemisphere, the same circles *ca*, *EQ*, *tm*, will represent the motion of the heavenly bodies as they descend from the meridian above the horizon to the meridian below. Hence, a body is at its greatest altitude when it is upon the meridian; and at equal altitudes at equal distances on each side of the meridian, if the body have not changed its declination. Now as all the *fixed stars* constantly retain their same situations, each must always rise and set at the same point of the horizon, and continue for the same length of time above the horizon; in these bodies, therefore, there will be no variety of appearance. But the *sun*, *moon*, and *planets* are continually changing their situation, and are sometimes on one side of the equator and sometimes on the other. We will, therefore next describe the phenomena attending these bodies,

43. The semicircle *COL* represents one half of the ecliptic, or one half of the sun's apparent

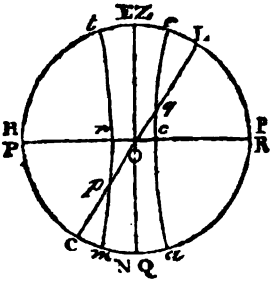
yearly motion; and let C be the first point of capricorn, and L the first point of cancer. If we therefore suppose the *sun* to be at any point *p*, on the *contrary* side of the equator to that of the spectator, on that day, by the diurnal rotation of the earth, he appears to describe the circle *mpnrst*; when he is at *m*, it is midnight; when he comes to *s*, he rises; and when he comes to *t*, it is noon; and from noon to midnight he will describe the path *tsrnpm* in the western hemisphere. Now as *ms* is greater than *st*, the sun will be longer below the horizon than above, and therefore the nights will be longer than the days; and the sun rises at *s* from the east towards the south, and sets as far from the west towards the south. When the sun is *in* the equator at *O*, his diurnal motion is then *QOE*; and as *QO=OE*, he is as long below as above the horizon, and the days and nights are equal; and he rises in the east at *O*, and sets in the west. When the sun is at any point *q*, on the *same* side of the equator with the spectator, on that day he describes, by his diurnal motion, the circle *abcdqe*, and as *ab* is less than *be*, he is longer above the horizon than below it, and the days are longer than the nights; and he rises at *b* from the east O towards the north, and sets from the west towards the north. It is manifest, therefore, that the length of the days increases from the time the sun leaves *C*, the first point of capricorn, till he comes to *L*, the first point of cancer; and then they gradually decrease again from the time the sun leaves *L* till he comes to *C*. If *ae*, *mi*, be equidistant from *EQ*, then will *be=ms*, and *ab=st*; hence, when the sun is at equal distances from the equator, and on opposite sides, the length of the day at one time is equal to the length of the night at the other, and the length of the night at the former is equal to the length of the day at the latter time. At every place, therefore, the sun, in the course of a year, is half a year above the horizon and half a year below.* Hence, the different lengths of days and nights, and the variety of seasons, arise from the sun being sometimes on one side of the equator, and sometimes on the other, or from the ecliptic CL being inclined to the equator, or from the axis of the earth which coincides with *PP'*, being inclined to the ecliptic CL, the path of the earth.

44. As the sun illuminates one half of the earth, or 90° all round about that place to which he is vertical, when he is *in* the equator, he will just illuminate as far as each pole: when he is on the north side of the equator, the north pole will be within the illuminated part, and the south pole will be in the dark part; and when the sun is on the south side of the equator, the south pole will be within the illuminated part, and the north pole in the dark part. When the sun is got to 23°. 28′, (his greatest distance from the equator,) he then illuminates the earth to 23°. 28′ on the other side of the pole; and if two circles be described about the poles at that distance, that about the *north* pole is called the *arctic* circle, and that about the south pole is called the *antarctic* circle. These are also called *polar* circles. If two circles be described upon the earth, parallel to the equator, at the distance of 23°. 28′ from it, they are called *tropical* circles, or the *tropics*.

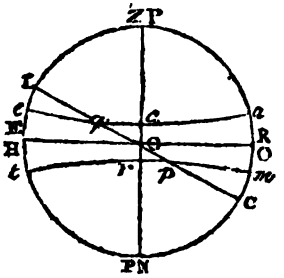
45. Let *Hw*, *Rv*, *xy*, be small circles parallel to *EOQ*. Now it is manifest, that a body which describes the circle *Rv*, or any circle *xy* nearer to *P*, never sets; and such circles are called circles of

* This is not accurately true, because the sun's motion in the ecliptic is not uniform, on which account he is not exactly as long on one side of the equator as on the other; the summer half year, or the time from the sun's leaving the first point of aries till he comes to the first point of libra, is about eight days longer than the winter half year.

perpetual apparition; and the stars which describe them are called *circumpolar* stars. The body which describes the circle wH, just becomes visible at H, and then it instantly descends below the horizon; but the bodies which are nearer to F' are never visible. Such are the phenomena of the diurnal motions of the heavenly bodies, when the spectator is situated any where between the equator and the poles; and this is called an *oblique* sphere, because all the bodies rise and set obliquely to the horizon.



46. If the spectator be at the *equator*, then E coincides with Z, because Z answers to the place of the spectator on the earth, and EOQ coincides with ZON, consequently $P'OP$ coincides with HOR. Hence, as the equator EOQ is perpendicular to the horizon, the circles *ace*, *mrt*, parallel to EOQ, are also perpendicular to the horizon, and therefore the horizon bisects them. To a spectator therefore at the equator, all the heavenly bodies in their diurnal motion are as long above the horizon as below; and they rise and set at right angles to it, on which account, this is called a *right* sphere. Hence, at the equator the days and nights are each always 12 hours long. There will however be some variety of seasons, as the sun will recede to L and C, 23° 28′ on each side of the spectator. When the sun is in the equator, he will be vertical to the spectator at noon; for one half of the year he will come to the meridian to the north of the zenith, and the other half of the year, to the south of the zenith.



47. If the spectator be at the *pole*, then P coincides with Z, and PP' coincides with ZN; consequently ROQ coincides with HOR. Hence, the circles *ea*, *tm*, parallel to the equator, are also parallel to the horizon; therefore as a body in its diurnal motion describes a circle parallel to the horizon, all the fixed stars which are at any time above the horizon, must continue above the horizon, and those which are below, must continue below; and the spectator always sees the same face of the heavens, because none of the bodies, by their diurnal motion, can either rise or set. This is called a *parallel* sphere, because the diurnal motion of all the heavenly bodies is parallel to the horizon. But as the sun describes the ecliptic COL, and $CO=OL$, and the part CO is never brought above the horizon, by the diurnal motion, and the part OL is never carried below, the sun must be half a year below the horizon, and half a year above, so that there is half a year day, and half a year night.

48. All those things will be very evident by means of a celestial globe. Place the axis obliquely to the horizon, and you will see that all the circles parallel to the equator are cut into two unequal parts; and the more you elevate the pole, or the nearer you bring the spectator to the pole, the greater will be the difference of those parts; that is, as the spectator approaches the

pole, the length of the days will be increased, and that of the nights decreased, when the sun is on the *same* side of the equator as the spectator; and the length of the days will be decreased and that of the nights increased, when the sun is on the *contrary* side. If you bring the poles down to the horizon, you will see that all the parallels to the equator are cut into two equal parts, so that there is always equal day and night to a spectator at the equator. If you bring the pole to the zenith, or if the spectator be at the pole, and you turn the globe about, one half of the ecliptic will continue above the horizon and the other half below, so that the sun will be half a year above the horizon, and half a year below. Thus it appears, that as you travel from the equator to the poles, for one half of the year the length of the day will increase from 12 hours to half a year; and for the other half of the year, the length of the night will increase from 12 hours to half a year.

49. The greater degree of heat in summer than in winter, arises from three causes. 1. The sun is a longer time above the horizon in summer than in winter. 2. The sun rising higher above the horizon in summer than in winter, more rays will fall upon the earth in the former than in the latter season. 3. The higher the sun is above the horizon, the greater is the force of the rays. Moreover, the parts which are heated, retain their heat for some time, which, with the additional heat acquired, make it continue to increase after the middle of the summer; and this is the reason why July is generally hotter than June. And for the same reason, we frequently find it hotter at 2 o'clock in the afternoon than it is at noon. Likewise, bodies retain their cold for some time, and thus it happens, that January is generally colder than December.

50. The orbits of all the planets, and of the moon, are inclined to the equator, and therefore their motions amongst the fixed stars must be in circles inclined to the equator: hence, similar phenomena to those of the sun will take place in the times of their respective revolutions..... All the different appearances must therefore take place in the moon, in the course of a month. It is evident also, that these variations must be greater or less as the orbits are more or less inclined to the equator; hence, they must be greater in the moon than in the sun, the moon's orbit being more inclined to the equator than the sun's.

51. The altitude of the pole of the heavens above the horizon, is equal to the latitude of the place. For the arc ZE (fig. page xxxiii) is the measure of the latitude of the place; but $PE=ZR$, each being 90°; take away ZP which is common to both, and $EZ=PR$. Hence, PZ is the complement of latitude.

52. If there were a star exactly in the point P, then by taking its altitude PR above the horizon by a quadrant, and correcting it for refraction, you would get the latitude of the place; but as there is not a star in that place, the latitude may be found by observing the greatest and least altitude of a circumpolar star, applying the correction for refraction, and half the sum will be the altitude of the pole. For if yx be the circle described by a circumpolar star, then as $Px=Py$, we have $xR=PR+Px$, $=PR+Py$ and $yR=PR-Py$; add these equations together, and we have $xR+yR=2PR$, therefore $\frac{1}{2}(XR+yR)=PR$ the latitude.

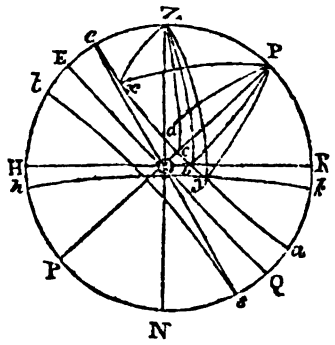
53. The angle which the equator makes with the horizon, is equal to the complement* of the latitude of the place. For HE is the measure of the angle HOE; and as $HZ=90°$, HE is the complement of ZE, and ZE is the latitude.

54. Hence, the latitude of a place may be found thus. Let eOe (fig. page xxviii) be the ecliptic, and then when the sun comes to e it is at its greatest north declination, at which

* The *complement* of an arc, or angle, is what it wants of 90°; and the *supplement* is what an arc, or angle, wants of 180°. Also, co-altitude means the complement of the altitude, and the same for other quantities.

time the days are longest, and at t its south declination is the greatest, at which time the days are shortest; also eH is the meridian altitude of the sun on the longest day, and tH is the meridian altitude on the shortest day. Now as $tE=Ee$, we have $eH=EH+Ee$, and $tH=EH-Et=EH-Ee$; add these equations together, and we get $eH+tH=2\,EH$, therefore $\frac{1}{2}(eH+tH)=EH$ the complement of the latitude. The complement of latitude is therefore equal to half the sum of the true meridian altitudes of the sun on the longest and shortest days.

55. Half the difference of the meridian altitudes of the sun on the longest and shortest days, is equal to the inclination of the equator to the ecliptic. For the difference between eH and tH is et, and the half of et is Ec, which measures the angle EOc, the inclination of the equator to the ecliptic.



56. Let hk be a circle parallel to the horizon HOR, and 18° below it; and let $ayb\,c\,d\,x\,e$ be any circle parallel to the equator, described by an heavenly body in the eastern hemisphere; and draw the circles Py, $l\,b$, Pd, Px, and Zy, Zb, Zc, Zx. Now (as has been already explained) when the sun comes to y, twilight begins; when any body comes to b, it rises; when it comes to c, it is at the middle point between a and e; when it comes to d, it is due east; and let x be the place at any other time. Now let us suppose this body to be the sun, and not to change its declination in its passage from a to e; and let us suppose a clock to be adjusted to go 24 hours in one apparent diurnal revolution of the sun, or from the time it leaves any meridian till it returns to it again; then the sun will always approach the meridian at the rate of 15° in an hour; also, the angle which the sun describes about the pole, varies at the same rate, because any arc xe, which the sun has to describe before, it comes to the meridian, measures the angle xPe, called the *hour angle*. If therefore we suppose the clock to show 12 when the sun is on the meridian at a and e, it will be six o'clock when he is at c. And as the sun describes angles about the pole P at the rate of 15° in an hour, the angle between any circle Px, passing through the sun at x, and the meridian PE, converted into time at the rate of 15° for an hour, will give the time from *apparent* noon, or when the sun comes to the meridian. Also, when the sun is at any point x, the angle xZP is his azimuth from the north; xZ is the complement of his altitude; and xP is the complement of his declination. This being premised, we shall proceed to give the solution of a few problems which will be found very useful in practical astronomy and navigation.

57. The declination of a body, is the difference between its meridian altitude, and the complement of the latitude. For the declination $Ee=He-HE$, where HE is the meridian altitude, and HE is the complement of latitude, by art. 53. Also, the declination $Et=HE-Ht$, and Ht is the meridian altitude.

58. *Given the latitude of the place, and the declination of the sun, to find the time of his rising, and his azimuth at that time.*

Let ae be the parallel of declination described by the sun on the given day; then when the sun comes to b, he rises. Now in the spherical

triangle bZP, bZ=90° (the zenith being 90° from the horizon) bP=the complement of the sun's declination, and PZ=the complement of latitude; and by spherical trigonometry, radius : cotan. bP : : cotan. ZP : cos. ZPb. or, radius : tan. decl. : : tan. lat. : cos. ZPb the *hour angle* from *apparent* noon; which converted into time at the rate of 15° for an hour, and subtracted from 12 o'clock, gives the *apparent* time of rising, or the hour at which the sun rises, supposing it be 12 o'clock when he comes to the meridian.

Also, sin. ZP: radius : : cos. bP: sin. PZb, or, cos. lat. : radius : : sin. decl. : cos. of the *azimuth* from the north.

Ex. Given the latitude of Cambridge 52°. 12′. 35″, to find the time of the sun's rising on the longest day, and his *azimuth* at that time; assuming the sun's greatest declination 23°. 28′.

By logarithms the operation will stand thus:

rad.			10,0000000
tan.	23°	28′. 0″	9,6376106
tan.	52.	12. 35	10,1104699
cos.	124.	2 47*	9,7480805

Convert this into time, and it gives 8h. 19′. 6″, which subtracted from 12, there remains 3h. 40′. 54″, the *apparent* time at which the sun rises. Also,

cos. 52°. 12′. 35″	0,2127004	ar. co.
radius	10,0000000	
sin. 23. 28.	9,6001181	
cos. 49. 28. 9	9,8128185	

Hence on the longest day the sun rises 49°. 28′. 9″. from the north.

59. *To find the sun's altitude at six o'clock on the same day.*

At six o'clock the sun is at c, and ZPc is a right angle; hence, radius : cos. ZP : : cos. Pc : cos. Zc, or radius : sin. lat. : : sin. dec. : sin. of the *altitude*.

By logarithms the operation is thus:

radius		10,0000000
sin. 52°.	12′. 35″	9,8977695
sin. 23.	28. 0	9,6001181
sin. 18.	20. 32	
the *altitude*		9,4978876

60. *To find the time when the Sun comes due east, and his altitude at that time, on the same day.*

The sun is due east when he comes to the prime vertical at d, and dZP is a right angle; hence cos. ZP : radius : : cos. dP. : cos. Zd. or, sin. lat. : radius : : sin. dec. : sin. of the *altitude*.

Also, radius : cotan. Pd : : tan. PZ : cos. ZPd, or, radius : tan. dec. : : cotan. lat. : cos. ZPd the *hour angle*, which converted into time, gives the time from *apparent* noon.

By logarithms, the operation is thus:

sin. 52°.	12′. 35″	0,1022305 ar. co.
radius		10,0000000
sin. 23.	28. 0	9,6001181
sin. 30.	15. 31	
the *altitude*		9,7023486

* This log .9,7480805 is found in the tables to be the log. cosine of 55°. 57′. 13″, but as the angle is manifestly greater than 90°, we must take its supplement. In the solution of spherical triangles, ambiguous cases will frequently arise, for the determination of which, the reader is referred to Dr. Maskelyne's excellent introduction to Taylor's Logarithms; or to Mr. Vince's *Treatise on plane and spherical Trigonometry*, containing an explanation of the *Construction and Use of Logarithms*.

radius			10,0000000
tan.	23°.	28′. 0″	9,6376106
cot.	52.	12. 35	9,8895301
cos.	70.	19. 44	
$=ZPd$			9,5271407

This angle 70°. 19′. 44″ converted into time, gives 4h. 41′. 19″ the time from *apparent* noon.

61. *Given the latitude of the place, the Sun's declination and his altitude, to find the hour.*

Let x be the sun's place: then in the triangle xZP, xZ is the complement of the altitude, xP is the complement of declination, and PZ is the complement of the latitude, all which are given; hence, by spherical trigonometry, sin. xP + sin. ZP : $\overline{\text{rad.}}^2$ :: sin. $\frac{1}{2}(Px+PZ+Zx)$ + sin. $(Px+PZ-Zx)$: cos. $\frac{1}{2}\overline{ZPx}^2$, therefore the hour angle ZPx is known, which converted into time, gives the time from *apparent* noon.

Ex. Given the latitude 34°. 55′ N. the sun's declination 22°. 22′ 57″ N. and his true altitude 36°. 59′. 39″, to find the *apparent* time.

Here, $ZP=55°.5'$, $Zx=53°.0'.21''$, $Px=67°.37'3''$; and the operation by logarithms is thus:

			ar co. sin.
Px	67°.	37′ 3″	 0,034019
ZP	55.	5. 0	 0,086193
Zx	53.	0. 21	
Sum	175.	42. 24	
½ Sum	87.	51. 12	sin. 9,999694
Zx	53.	0. 21	
Dif.	34.	50. 51	sin. 9,756932
			2)19,876838
29.	47.	44 = ½ZPx	co. 9,938419

Hence, $ZPx=59°.35'.28''$, which converted into time, gives 3h. 58′. 22″ the time from *apparent* noon.

This problem is used in finding the longitude by the lunar method.

62. *Given the latitude of the place, and the Sun's declination, to find the time when the twilight begins.*

Twilight begins when the sun comes to y, 18° below the horizon; hence $Zy=108°$; also, Py is the complement of declination, and ZP is the complement of latitude; hence, sin. yP + sin. ZP : $\overline{\text{rad.}}^2$ :: sin. $\frac{1}{2}(PZ+Py+108°)$ + sin $\frac{1}{2}(PZ+Py-108°)$: cos. $\frac{1}{2}\overline{yPZ}^2$, therefore yPZ is known, which converted into time, gives the time from *apparent* noon, when twilight begins.

This rule being the same as the last, the method of calculation is the same.

63. *To find where the longest day is 24 hours.*

Let QR (see fig. on page xxxi.) $=23°.28'$, then the sun on the longest day describes the circle Rv, and this circle just touching the horizon at R, it will wholly be above the horizon, therefore the sun continues above the horizon for its whole apparent diurnal motion, that is, for 24 hours. Now $QR=EH=$ the complement of latitude, by article 53; hence, the latitude is 66°. 32′.; therefore the spectator is at the arctic circle, as appears by art. 44.

64. To a spectator at the same place, on the shortest day the sun is at the distance EH on the other side of the equator, and at that time he describes the circle wH in his diurnal motion, and therefore he continues 24 hours below the horizon; therefore the longest night is 24 hours. Now we have already observed (art 48.), that as a spec-

tator moves from the equator to the poles, the length of the day increases from 12 hours to half a year; hence, the longest day is more than 24 hours within the polar circle, and less than 24, on every other part of the earth.

65. *To find at what time of the year the twilight lasts just all night.*

Let *ae* be the parallel described by the sun at that time, then *Ra* must be 18°, for at that distance below the horizon, twilight begins; hence 18°+dec. $Qa = RQ = EH =$ comp. of latitude, by art. 53.; therefore, by transposition, sun's dec. = comp. of lat.—18°. But if the sun be on the other side of the equator at *m*, then $Rm = 18°$, and 18°—declin. $Qm = RQ = EH =$ comp. of lat. therefore, sun's dec. = 18°—comp. of latitude. Look therefore into the *Nautical Almanac*, and see on what day the sun has this declination, and you have the time required.

Ex. Let the latitude be 52°. 12′ N. then its complement is 37° 48′; hence, the declination is 37°. 48′—18° = 19°. 48′ N. which answers to about May 19, and July 24, at which times there is twilight just all night. Therefore from May 19 to July 24 there will be twilight all night.

66. The greatest value of *Qa* is 23°. 28′, therefore when *aR* is 18°, the greatest value of *QR* is 41° 28′; if therefore *QR* be greater than 41°. 28′, then *Ra* must always be greater than 18°, and therefore there will be no twilight when the sun is at *a*; hence, when the complement of latitude is greater than 41°. 28′, or when the latitude is less than 48°. 32′, there never can be twilight all night.

ASTRONOMICAL TERMS, ARISING FROM DIFFERENT SITUATIONS OF THE SPECTATOR UPON THE EARTH.

67. By means of the two tropics and two polar circles upon the earth, the whole surface is divided into five parts, called *zones*: that which is included between the tropics, is called the *torrid zone*: the two parts lying between the tropics and the polar circles, are called the *temperate* zones: the two parts within the polar circles, are called the *frigid* zones. The inhabitants of these zones are distinguished by the different directions of their shadows arising from the sun. They who live between the tropics, or in the *torrid* zone, have the sun vertical to them at noon twice in the year; thus, an inhabitant in 10° north latitude has the sun vertical to him when its declination is 10° north. And, in general, this will happen when the latitude of the inhabitant is equal to the declination of the sun, and both of the same kind, that is, both north, or both south. At all other times, when the sun comes to the meridian, the shadow is either to the north or the south of the zenith. The inhabitants of this zone are called *Amphiscii*, that is, having both kinds of meridian shadows.

68. They who live in the *temperate* zones, have their shadows at noon always the same way, and are therefore called *Heteroscii*, that is, having only one kind of meridian shadow.

69. They who live in the *frigid* zones, have, when the days are more than 24 hours long, the sun moving all round them, and therefore their shadows are cast all round them, and hence they are called *Periscii*.

70. The inhabitants of the earth have also been distinguished into three kinds, in respect to their relative situations. They who live at opposite points of the same parallel to the equator, are called, in respect to each other, *Perieci*..... These have the same seasons of the year; but it is midnight to one when it is noon, or midday, to the other.

71. They who live under the same meridian and in opposite parallels, that is, in two parallels to the equator, and equidistant from it, are called *Antæci*. These have day and

night at the same time, but different seasons, it being summer with one when it is winter with the other.

72. They who live under opposite meridians and opposite parallels, are called *Antipodes*. These have their days and nights, and also their seasons, opposite, that is, it is day with one when it is night with the other, and summer with one when it is winter with the other.

TO FIND THE RIGHT ASCENSION AND DECLINATION OF THE HEAVENLY BODIES.

73. The foundation of all astronomy is to determine the places of the fixed stars, in order to find, by a reference to them as fixed objects, the places of the other bodies, at any given times, by which means you can trace out their paths in the heavens. The positions of the fixed stars are found from observation, by finding their right ascensions and declinations, for it is manifest, that if we know the right ascension *Am*, and declination *ms*, we know the point *s* (see fig. page xxx). Now the *declination* is found thus. Find the latitude of the place by the 52d or 54th articles, and then we know *EH* the complement of latitude (see the last figure). By the astronomical quadrant, described in art. 17, find the true meridian altitude *He* of the body; then the difference between *EH* and *He* is *Ec*, the declination required.

74. To find the *right ascension* of a body. As the earth revolves uniformly about its axis, the apparent daily motion of all the heavenly bodies, arising from this motion of the earth, must be uniform; and as this motion is parallel to the equator, the interval of the times in which any two stars pass over the meridian, is in proportion to the corresponding arc of the equator which passes over the meridian in the same interval. Now let a clock be adjusted to go 24 hours in the time the earth makes a rotation about its axis, then it describes about its axis an angle of 15° every hour, and every point of the equator, and all the circles which are parallel to it, describe 15° in an hour; and all the stars appear to revolve at the same rate; so that if two stars should differ 15° in right ascension, one of them would pass over the meridian an hour after the other. And, in general, if you take the interval of the times in which any two stars pass the meridian, and convert that interval of time into degrees, at the rate of 15° for an hour, you will have the difference of the right ascensions of those two stars; if therefore you know the right ascension of one of the stars, you will know the right ascension of the other. Thus, by knowing the right ascension of one star, and comparing all the other heavenly bodies with it, you will get their right ascensions. For the method of finding the right ascension of some one star, we refer the reader to Mr. VINCE'S *Complete System of Astronomy*. The time when any body comes to the meridian is known by its passage over the middle perpendicular wire of the transit telescope, as described in art. 18. The right ascension is reckoned both by time and by degrees; thus, we say a star has 15°, 30°, 45°. &c. right ascension, or its right ascension is 1 hour, 2 hours, 3 hours, &c.

75. But a more ready and practical method of finding the right ascension of a body, is thus: Let a clock be adjusted to go 24 hours in the time in which the earth revolves about its axis, in which time all the fixed stars appear to have made one revolution; and a clock thus adjusted is said to be adjusted to *sidereal* time. Now let the clock begin its motion from 0h. 0′. 0″. at the instant the first point of aries is upon the meridian, from which point we begin to reckon the right ascension; then, when any star comes to the meridian, the clock would show the apparent right ascension of the star, provided it was subject to no error, because it would then show, at any

time, how far the first point of áries was from the meridian, reckoning 15 degrees for every hour. But as every clock is subject to err, we must be able at any time to find its error. To do this, we must, when a star, whose apparent right ascension is known, passes the meridian, compare its right ascension with the right ascension shown by the clock, and the difference will show the error of the clock. For instance, let the apparent right ascension of *aldebaran* be 4h. 23′. 50″. when it passes over the meridian, and at that time suppose the clock to show 4h. 23′. 56″, then the clock is at that time 6″ to fast; and by thus continually comparing the clock with stars whose right ascensions are known, you will always have the error of the clock; and you will also see at what rate it gains or loses, called the *rate of its going*. The error of the clock, and the rate of its going being thus ascertained, if the time of the transit of any body be observed, and the error of the clock be applied, you will have the right ascension of the body.

76. Thus we determine the declination *ms*, and right ascension *Am*, of any heavenly body *s*; and from these we can, by spherical trigonometry, find the latitude *ns* and the longitude *An* (see fig. page 30); and it is manifest, that if we know these two quantities, we shall also know the place *s* of the body; and it is frequently more useful to make use of the latitude and longitude, than it is the declination and right ascension, for finding the place of a body; it is necessary, therefore, in such cases, to compute the latitude and longitude from the right ascension and declination; for the method of doing which we refer the reader to the above-mentioned work.

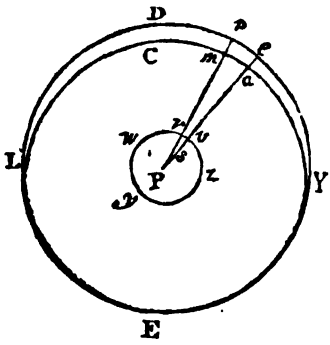
77. Being thus able to find the situation of a body in the heavens, we can every day determine the place of all the heavenly bodies which have any motions, and thus we find out the paths which they describe, and how fast they move.

ON THE EQUATION OF TIME.

78. The best measure of time which we have, is a clock regulated by the vibration of a pendulum. But with whatever accuracy a clock may be made, it must be subject to go irregularly, partly from the imperfection of the workmanship, and partly from the expansion and contraction of the materials by heat and cold, by which the length of the pendulum, and consequently the time of a vibration, will vary. As no clock therefore can be depended upon for keeping time accurately, it is necessary that we should be able at any time to ascertain how much it is too fast or too slow, and at what rate it gains or loses. For this purpose, it must be compared with some motion which is uniform, or of which, if it be not uniform, you can find the variation. The motions of the heavenly bodies have therefore been considered as most proper for this purpose. Now as the earth revolves uniformly about its axis, the apparent diurnal motion of all the heavenly bodies about the axis must be uniform. If a clock therefore be adjusted to go 24 hours from the passage of any fixed star over the meridian till it returns to it again, its rate of going may be determined by comparing it with the transit of any fixed star, and observing whether the interval continues to be 24 hours; if not, the difference shows how much it gains or loses in that time. A clock thus adjusted is said to be adjusted to *sidereal* time; and all the sidereal days are equal. But all the *solar* days are not equal, that is, the intervals from the sun's leaving the meridian till it returns to it, are not all equal, so that if a clock be adjusted to go 24 hours in one interval, another interval will be performed in more or less than 24 hours, and thus the sun and the clock will not agree, that is, the clock will not continue to show 12 when the sun comes to the meridian.

79. For let *P* represent the pole of the earth, *vwyz* its equator, and

suppose the earth to revolve about its axis, in the order of the letters *vwyz*; and let *YDLE* be the celestial equator, and *YCL* the ecliptic, in which the sun moves according to that direction.



Let *s* be the place of a spectator, and draw the meridian *Psvae*, and let us suppose the sun to be at *a* on the meridian. Then when the earth has made one revolution about its axis, the spectator at *s* will come again into the same situation, and be again on the same meridian *Psvae;* but the sun is not now again on the meridian, because he has moved forward in the ecliptic towards L; if therefore *m* be the point where the sun is when he next comes to the meridian, or rather when the meridian overtakes him, and you draw the meridian *Prmp*, then the earth, after it has made a revolution about its axis, has described the angle *vPr* before the spectator at *s* be brought again into the meridian *Pmp* of the sun. Now the angle *vPr* is measured by the arc *pe*, which is the increase of the sun's right ascension in the time he moves from *a* to *m*, or in a *true* solar day; hence, the length of a true solar day is *equal to the time of the earth's rotation about its axis, together with the time of describing an angle equal to the increase of the sun's right ascension in a true solar day.* Now if the sun moved uniformly, and also in the equator *YDLE*, this increase *ep* would be always the same in the same time, and therefore the solar days would be all equal; but the sun moves in the ecliptic *YCL*, and therefore *if* its motion were *uniform*, equal arcs *(am)* upon the ecliptic would not give equal arcs (*ep*) upon the equator. But the motion of the sun in the ecliptic is *not* uniform, and hence also *am*, described in a given time, is subject to a variation, and consequently *ep* is subject to a variation. Hence, the increase *ep* of the sun's right ascension in a *true* solar day, varies from two causes; 1st. Because the ecliptic, in which the sun moves, is inclined to the equator; 2d. Because his motion in the ecliptic is not uniform; therefore the length of a true *solar* day is subject to a continual variation; consequently a clock which is adjusted to go 24 hours for any one true solar day, will not continue to show 12 when the sun comes to the meridian; because the intervals by the clock will continue equal (the clock being supposed neither to gain nor lose), but the intervals of the sun's passage over the meridian are not equal.

80. As the sun moves through 360° of right ascension in $365\frac{1}{4}$ days, therefore $365\frac{1}{4}$ days : 1 day : : 360° : 59′. 8″, 2 the increase of right ascension in 1 day, if the increase were uniform, or it would be the increase in a *mean* solar day, that is, if the solar days were all equal; for they would be all equal, if the sun's right ascension increased uniformly, as appears by the last article.* If therefore a clock be adjusted to go 24 hours in a *mean* solar day, it will not continue to coincide with the sun, that is, to show 12 when the sun comes to

* As the earth describes an angle of 360°. 59′. 8″,2 about its axis in a *mean* solar day of 24 hours, and an angle of 360° in a *sidereal* day, therefore 360° 59′. 8″,2 : 360° : : 24h. : 23h 56′ 4″,098 the length of a sidereal day in *mean* solar time, or the time from the passage of a fixed star over the meridian till it returns to it again.

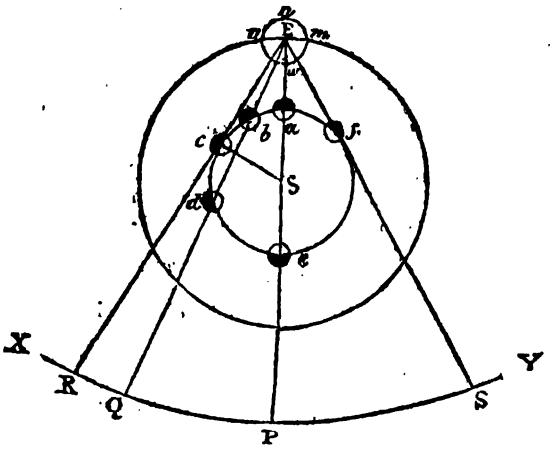
the meridian, because the *true* solar days differ in length from a *mean* solar day, but the sun will pass the meridian, sometimes *before* 12, and sometimes *after* 12, and this difference is called the *equation of time*. A clock thus adjusted, is said to be adjusted to *mean* solar time. The time shown by the clock is called *true* or *mean* time; and that shown by the sun is called *apparent* time; thus when the sun comes to the meridian, it is said to be 12 o'clock, *apparent* time. Hence, the time shown by a sun-dial is *apparent* time, and therefore a dial will differ from a clock, by how much the equation of time is on that day. When therefore you set a watch by the dial, you must see what the equation of time is upon that day, and allow for it; for instance, if the equation be 3 minutes, and the watch be faster than the sun, then you must set your watch 3 minutes before the time shown by the dial. Now astronomers, when they compute tables of the equation of time for every day of the year, set the sun and clock together, when the sun is at his apogee, and then they calculate what is the difference between the sun and the clock, for every day at noon, and insert them in a table, stating how much the clock is before or after the sun. For the methods of making these calculations, we must refer the reader to the Treatise before mentioned. The inclination of the equator to the ecliptic, upon which the equation of time partly depends, and the place of the sun's apogee, when the clock and sun set off together, being both subject to vary, the equation of time for the same days of the year, will every year vary, and therefore it must be calculated every year. Besides the time when the sun is in his apogee, there are three other times of the year when the clock and sun agree, or when *mean* and *apparent* times are the same.

81. Whenever it is required to make any calculations from astronomical tables, and the time given is *apparent* time, the equation of time must be applied in order to convert it into *mean* time, and for that time the computations must be made, because all tables are constructed for *mean* motions. Thus, if it were required to find the sun's place on any day at *apparent* noon, the equation of time must be applied to 12 o'clock, and then the sun's place must be computed from the tables for that time. All the articles in the *Nautical Almanac*, answering to noon, are computed in this manner.

ON THE SOLAR SYSTEM.

82. The sun is placed in the centre of the system, about which the planets revolve in the following order, reckoning from the sun: *mercury*, *venus*, the *earth*, *mars*, *jupiter*, *saturn*, and the *georgian*; these are sometimes called *primary* planets. Some of these planets have bodies revolving about them; the earth has one; jupiter has four; saturn has seven; and the georgian has six; these are called *secondary* planets, *satellites*, or *moons*. There are also other bodies which revolve about the sun, called *Comets*, which move in orbits very elliptical, and extend to a very great distance beyond the orbits of the primary planets. The sun, the primary planets, the secondary planets, and the comets, compose what is called the *Solar System*. The two planets which are nearer to the sun than the earth is, are called *inferior* planets; and the other five which are further from the sun than the earth is, are called *superior* planets. All the other bodies in the heavens are fixed stars, and at such immense distances beyond the solar system, that their apparent relative situations are not at all altered by the motion of the earth in its orbit; we may therefore consider them as placed in the concave surface of a sphere, having the earth for its centre; and to these we refer the motions of the bodies in our system. The orbits of the primary planets are ellipses, having the sun in one

of the foci; but they are so very nearly circles, that, for our present purpose, we may consider them as circles having the sun in the centre.



83. Let *S* be the sun, *E* the earth, *abcdef* the orbit of one of the *inferior* planets, *venus* or *mercury*; *XY* the sphere of the fixed stars; draw *EaScP*, *EbdQ*, and let *EcR*, *EfS* be tangents to the orbit of the planet, and let *a*, *b*, *c*, *d*, *e*, *f*, be so many different situations of the planet; then as the planets are opaque bodies, that half which is next to the sun is enlightened, and the other half is dark, as represented in the figure. The situation *a* is called *inferior* conjunction, and the situation *e* is called *superior* conjunction. Now it is manifest, that at *a* the dark part only of the planet is towards the earth, and therefore the planet is then invisible; at *b*, a part of the enlightened face is towards the earth, and therefore part of the planet will be visible, and will look like the moon before it comes to its first quarter; at *c*, one half of the enlightened part of the planet will be turned towards the earth, and it will look like the moon at its first quarter; at *d*, more than half the enlightened part of the planet will be towards the earth, and it will look like the moon between its second quarter and full; at *e*, the whole enlightened part of the planet will be next the earth, and the planet will appear to shine with a full face, like the moon at its full; and from *e* through *f* to *a*, the appearances will be the same in the contrary order. These are the *phenomena* which an inferior planet must have; and as, by viewing *venus* and *mercury* with a telescope, they are found to have all these phenomena, we conclude that they must be inferior planets. Now the angle *cES* is the greatest distance at which these planets appear from the sun, or the greatest elongation; and as this angle is found to be greater for *venus* than it is for *mercury*, we know that *mercury* is nearer to the *sun* than *venus*.

84. When the planet is at *a*, it appears in the heavens amongst the fixed stars at *P*; when it is at *b*, it appears at *Q*; when it is at *c*, it appears at *R*; when it is at *d*, it appears at *Q*; when is at *e*, it appears at *P*; when it is at *f*, it appears at *S*; and when it returns to *a*, it appears at *P*; at which place also the sun appears. It is manifest, therefore, that an inferior planet appears to move backwards and

forwards in the heavens, from S to R, and from R to S; and therefore there must be two points where the planet appears stationary; for if a planet first appear to move one way and then back again in a contrary direction, the motion must first cease in one direction before it takes place in a contrary direction. We have here supposed the earth to be at rest at E, but all the same phenomena will take place if we suppose the earth to be in motion; for an inferior planet moves faster about the sun than the earth does, and therefore when it comes into inferior conjunction at a, it will immediately leave the earth behind it, and have the same relative situations in respect to the earth and sun, as we have described above. If the earth were at rest, the two stationary points would be at R and S, when the planet was on each side at its greatest elongation from the sun (appearing at P); but as the earth is in motion, these will not be the stationary points. The true stationary points (which call P and S) are determined, by finding when a line joining the earth and planet continues parallel to itself for a very small time.

85. The earth and all the planets revolve about the sun in the direction XY; that direction is therefore *direct*, and the contrary direction XY is *retrograde* (see art. 19). Hence, an inferior planet appears to move direct, from the stationary point R before it comes to the superior conjunction, till it comes to the stationary point S after; and it appears to move retrograde, from the stationary point S before it comes to the inferior conjunction, till it comes to the stationary point R after; therefore whilst an inferior planet is passing through its inferior conjunction, it is retrograde; and whilst it is passing through its superior conjunction, its motion is direct. As the arc cef is greater than the arc fac, the planet is longer direct than it is retrograde. It appears also from hence, that the two inferior planets will constantly attend the sun, receding to a certain distance on each side, and then returning again to him. As the orbits of the planets are not circles, but ellipses, the greatest elongations of *venus* and *mercury* are not always the same; the greatest elongations of *venus* are from 44°. 57′ to 47°. 48′; and of *mercury* from 17°. 36′ to 28°. 20′. As *mercury* recedes but to a small distance from the sun, it is not often that it can be seen, as it must be in the most favourable situation for that purpose, and the atmosphere must also be very clear at the same time.

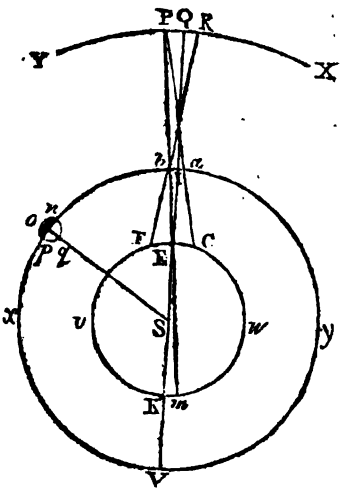
86. When *venus* is at the distance of 39°. 44′ from the sun, between its inferior conjunction and its greatest elongation, she then gives the greatest quantity of light to the earth; and at that time her brightness is so great as to cause a shadow. And if at that time she be at her greatest north latitude, her brightness is so great that she is seen by the naked eye at any time of the day when she is above the horizon; for when her north latitude is the greatest, she rises highest above the horizon, and her rays coming through less of the atmosphere, she is more easily seen.... This happens once in about 8 years, *venus* and the *earth* returning very nearly to the same parts of their orbits after that interval of time.

87. *Venus* is a *morning* star from inferior to superior conjunction, and an *evening* star from superior to inferior conjunction. The earth turns about her axis according to the order of the letters *mnvw*; when the spectator is at n, it is then night to him; and as, by the earth's rotation, he is carried towards v, it is manifest that the part *ace* of the orbit of venus will come into view before the sun S does; hence, if venus be any where in that part of her orbit, she will appear in the morning before sun-rise, and therefore she is then a *morning* star. As the spectator passes through *vwm*, it is day, and at m the sun will set; but the part *efa* of the orbit of venus will still be above his horizon, and therefore if venus be in that part, she will be visible after sun-set, and will then be an *evening* star.

88. The orbits of *venus* and *mercury* are inclined to the orbit of the earth, and cut it at two opposite points, called the *nodes*, so that if we conceive the orbit of the earth to lie in the plane of the paper, the orbits of venus and mercury will lie, one half above the paper, and the other half below. It is upon this account that venus and mercury, when they come into their inferior conjunction, at *a*, do not always appear to pass over the sun's disc, or make a transit over it. If the nodes happen to lie in conjunction and opposition, then, when the planet comes into conjunction at *a*, it is in a line joining the earth and sun, and it will appear to pass over the disc of the sun, like a small, round black spot. But if the nodes be at a certain distance from conjunction and opposition, when the planet comes into conjunction, it may be so far above or below the line joining the earth and sun, as not to pass over the sun. The transits of *venus* do not happen so often as those of *mercury*. The last transit of venus happened in 1769, and the next will be in 1874. The last transit of mercury happened in 1799, and the next will be in 1802.

89. When DR. HALLEY was at St. *Helena*, whither he went for the purpose of making a catalogue of the southern stars, he observed a transit of mercury over the sun's disc, and this suggested to him a method of finding the sun's parallax from such observations, from the difference of the times of transit over the sun, at different places upon the earth's surface. But the difference of the times being less for mercury than for venus, the conclusions will be more accurate for venus than for mercury. The Doctor therefore proposed to determine the parallax of the sun from the transit of venus; and as it was not probable that he himself should live to observe the two next transits, which happened in 1761 and 1769, he very earnestly recommended the attention of them to the astronomers who might then be alive. Astronomers were therefore sent from *England* and *France* to the most proper parts of the earth, to observe both these transits; from which observations it appears, that the horizontal parallax of the sun at his mean distance, is $8\frac{3}{4}''$; hence, by article 14, sin. $8\frac{3}{4}''$: rad. : : rad. of earth : mean distance of the sun from the earth; now sin. $8\frac{3}{4}''$: rad. : : 1 : 23575; therefore the mean distance of the sun from the earth is equal to 23575 semidiameters of the earth; and as we have determined (see art. 4) the radius of the earth to be 3965 miles, the mean distance of the earth from the sun = 23575 + 3965 = 93474875 miles. For the method of finding the horizontal parallax, we refer the reader to the Treatise of Astronomy which we have before mentioned.

90. Having described the phenomena attending the inferior planets, we proceed to describe those which attend the superior.



91. Let *S* be the sun, *E* the earth, *EvKw* the orbit of the earth, *IxVy* the orbit of a superior planet, *XY* the sphere of the fixed stars; draw *VKSEIQ*, *CaP*, *FbR*, *mbP*; then when the planet is at *I*, it is in

opposition to the sun, and at *K*, it is in *conjunction*. Now the earth moves faster than a superior planet; whilst the earth therefore moves from *C* to *E*, and from *E* to *F*, let the planet describe the smaller arcs *aI*, *Ib*. Then it is manifest, that when the earth is at *C*, the planet at *a* appears in the heavens at *P*; when the earth is at *E*, the planet at *I* appears at *Q*; and when the earth is at *F*, the planet at *b* appears at *R*; whilst therefore the earth moves from *C* to *F*, the planet appears to move from *P* to *R*, contrary to its real motion; hence, a superior planet is *retrograde* whilst it passes through *opposition*. Suppose now that when the earth is at *K* the planet is at *I* in conjunction with the sun, and let the earth move from *K* to *m* whilst the planet moves from *I* to *b*, then it will appear in the heavens to have moved from *Q* to *P*, or according to its real motion. Hence, a superior planet is *direct* when it passes through *conjunction*. As therefore a superior planet appears to move, sometimes direct and sometimes retrograde, it must appear stationary at the two points where the motion changes from one to the other.

92. When the planet is in opposition at *I*, or in conjunction at *K*, the earth being at *E*, it is manifest that the same face of the planet which is towards the sun, is also towards the earth, and therefore the planet appears full orbed; but if *nopq* be the position of the planet, then the spectator on the earth at *E* will have a little of the dark part of the planet beyond *n* turned towards him, and therefore it will not be full orbed to the earth, but will appear like the moon a little before or after its full. But if the planet be at a very great distance from the sun, when compared with the earth's distance, there will be so little of the dark part turned towards the earth, that it will, as to sense, appear full orbed. Now this is the case with all the superior planets, except *mars*, which between conjunction and opposition is observed to appear not full orbed; but all the rest do, on account of their great distances.

93. It is found by observation, that the places of the aphelia of the orbits of the planets, and the places of their nodes, have a motion, and that the inclinations of their orbits to the ecliptic are subject to a variation. These circumstances arise from the mutual attractions of the planets.

94. It appears, from what we have already observed, that *mercury*, *venus*, and *mars* are opaque bodies, as they do not always shine with full faces, that part towards the earth which is not towards the sun, being dark. *Jupiter* and *saturn* cast shadows, and eclipse their satellites, and therefore they must be opaque bodies. The *georgian* has never been seen to eclipse its satellites, as the satellites have not, since the discovery of the planet, been in a situation to be eclipsed by the planet; but it being a body revolving about the sun, like the other planets, and having also satellites revolving about it, we may conclude by analogy, that it is an opaque body.

95. KEPLER made three very important discoveries respecting the motions of the planets, and which are indeed the foundation of all astronomy.

1st. That the primary planets revolve about the sun in ellipses, having the sun in one of the foci. 2dly. That the squares of the periodic times of all the planets, have the same proportion to each other as the cubes of their respective mean distances. 3dly. That if a line be drawn from the sun to a planet, and move as the planet moves, it will describe about the sun, equal areas in equal times. These principles which KEPLER deduced from observation, Sir I. NEWTON proved to be true from the common principles of motion, and his theory of gravity.

96. The periodic time of the earth, or the time in which the earth makes a complete revolution in her orbit, called a *sidereal* revolution,

it 365d. 6h. 9′. 11″,5. The time from the earth's leaving the first point of aries till she returns to it, is 365d. 5h. 48′. 48″, and this is called a *tropical* revolution; and this being less than her periodic time, it follows that the equinoctial points move backwards; and this motion is called the *precession of the equinoxes*. The time from the earth's leaving her apogee till she returns to it, is 365d. 6h. 14′. 2″; and this being greater than her periodic time, it follows that her apogee moves forward; this is called her *anomalistic* year.

97. The following table contains the relative *mean* distances of the planets from the sun, assuming the mean distance of the earth to be *unity*; together with their periodic times.

Planets	MeanDist.	Periodic Times.
Mercury	0,38710	87d. 23h. 15′. 43″,6
Venus	0,72333	224d. 16h. 49. 10,6
Earth	1,00000	365d. 6h. 9. 11,6
Mars	1,52369	1y. 321d. 23h. 30. 35,6
Jupiter	5,20279	11y. 315d. 14h. 27. 10,8
Saturn	9,54072	29y. 174d. 1h. 51. 11,2
Georgian	19,18352	83y. 150d. 18h.

98. A table of the places of the aphelia of the orbits for the beginning of 1750, with their motions in longitude in 100 years.

Planets	Place of Aphelia	Mot. in 100 years
Mercury	8s. 13°. 33′. 58″.	1° 33′. 45″
Venus	10. 7. 46. 42.	1. 21. 0
Earth	3. 8. 37. 16.	1. 43. 35
Mars	5. 1. 28. 14.	1. 51. 40
Jupiter	6. 10. 21. 4.	1. 34. 33
Saturn	8. 28. 9. 7.	1. 50. 7
Georgian	11. 16. 19. 30.	1. 29. 2

99. A table of the places of the *ascending* nodes of the orbits of the planets for 1750, with their motions in longitude for 100 years.

Planets	Place of the Node.	Mot. of Node.
Mercury	1s. 15°. 20′. 43″	1°. 12′. 10″
Venus	2. 14. 26 18	0. 51 40
Mars	1. 17. 38 28	0. 46 40
Jupiter	3. 7. 55 32	0. 59 30
Saturn	3. 21. 32 22	0. 55 30

M. DE LA PLACE found the place of the node of the *Georgian* planet in 1788, to be 2°. 12′. 47″, but its motion is not yet determined.

100. A table of the inclinations of the orbits of the planets to the ecliptic for the year 1788; with the variation for 100 years.

Planets	Inclination			Variation
Mercury	7°.	0′	0″	+20″ 43
Venus	3.	23.	35	+4,47
Mars	1.	51.	0	+3,45
Jupiter	1.	18.	56	—27,19
Saturn	2.	29.	50	—23,11
Georgian	0.	46.	20	

The variation is that arising from theory, as determined by M. DE LA GRANGE. The sign +, shows that the inclination increases, and the sign —, that it decreases.

101. If two planets revolve in circular orbits, to find the time from conjunction to conjunction. Let P=the periodic time of a superior planet, p=the periodic time of an inferior planet, t=the time required. Then P : 1 day :: $\frac{360°}{P}$: 360° the angle described by the superior planet in 1 day; for the same reason, $\frac{360°}{P}$ is the angle described by the inferior planet in 1 day; therefore $\frac{360°}{p}-\frac{360°}{P}$ is the daily angular velocity of the inferior planet *from* the superior, or how much the former recedes from the latter, every day. Now if they set out from conjunction, they will return into conjunction again, after the inferior planet has gained one revolution, or 360°; therefore $\frac{360°}{p}-\frac{360°}{P}$: 360° :: 1 day : $t=\frac{Pp}{P-p}$. the rule, therefore, to find the required time, is, *to multiply the periodic times together, and divide by their difference.* This will also give the time between two oppositions, or between any two similar situations. The time from conjunction to conjunction is called a *synodic* revolution.

ON THE MOTION OF THE MOON, AND ITS PHENOMENA.

102. The moon being the nearest, and, next to the sun, the most remarkable body in our system, and also useful for the division of time, it is no wonder that the ancient astronomers were attentive to discover its motions, and the orbit which it describes. The motion of the moon in its orbit about the earth, is from west to east, and its orbit is found to be inclined to the ecliptic. The motion of the moon is also observed not to be uniform, and its distance from the earth is found to vary, which shows that it does not revolve in a circle about the earth and its centre; but its motion is found to be in an ellipse, having the earth in one of the foci. The position of the ellipse is observed to be continually changing, the major axis not being fixed, but moving sometimes direct and sometimes retrograde; but, upon the whole, the motion is direct; and it makes a complete revolution in a little more than 8½ years. The eccentricity of the ellipse is also found to change, that is, the ellipse is sometimes nearer to a circle than it is at other times. The inclination of its orbit is found likewise subject to a variation from 5° to 5°. 18′. All these irregularities arise from the sun disturbing the moon's motion by its attraction.

103. As the ellipse which the moon describes about the sun, is subject to a variation, the periodic time of the moon about the earth will also vary; in winter, the moon's orbit is dilated, and the periodic time is increased; and in summer, her orbit is contracted, and her periodic time is diminished. The periodic time of the moon increases whilst the sun is moving from his apogee to his perigee, and decreases whilst he moves from his perigee to his apogee; and the greatest difference of the periodic times is found to be about $22\frac{1}{2}$ minutes.

104. The *mean* periodic time of the moon is 27d. 7h. 43′. 11″,5; this is called her sidereal revolution, being the *mean* time from her leaving any fixed star, till her return to it again. Now it is found by observation, that the *mean* time from her leaving her apogee till she returns to it, is 27d. 13h. 18′. 4″; hence, the moon is longer in returning to her apogee than she is in making a revolution in her orbit, and therefore her apogee must move forward. The *mean* time from her leaving her node till she returns to it again, is 27d. 5h. 5′. 35″,6, and this being less than her *mean* periodic time, it follows that she returns to her node before she has completed her revolution, and therefore her nodes must have a retrograde motion.

105. The time between two *mean* conjunctions of the sun and moon, or from new moon to new moon, supposing their motions had both been uniform, is found by the rule in article 101; taking therefore the mean periodic time of the moon and sun as already stated, we get the *mean* time from conjunction to conjunction to be 29d. 12h. 44′. 2″,8, and this is called her *synodic* revolution. The *true* time from new to new moon will be sometimes greater and sometimes less than this. The causes of all these irregularities we will briefly explain.

106. The apparent diameter of the moon is found continually to vary; now the apparent diameter of any very distant body, varies inversely as its distance. Hence, as the apparent diameter of the moon increases, she must approach the earth; and when it decreases, she must recede from the earth. This variation of her apparent diameter agrees exactly with what ought to be the case, if the moon moved in an ellipse about the earth in one of its foci; we conclude therefore that the moon moves in an ellipse about the earth situated in one of its foci, as no other supposition will agree with the observed variation of the moon's diameter. From the variation of the sun's diameter, it appears in like manner, that the earth must revolve in an ellipse about the sun, having the sun in one of the foci.

107. The earth moving in an ellipse about the sun in its focus, the nearer the earth comes to the sun, the more it is attracted by him, and this attraction increases in the same ratio as the square of the distance diminishes; and on the contrary, it decreases as the square of the distance increases. As therefore the earth approaches the sun all the time it moves from the aphelion to the perihelion, the attraction increases, and conspiring partly with the earth's motion, it accelerates the motion of the earth; and when the earth moves from perihelion to aphelion, the attraction acts partly against the earth's motion, and diminishes its motion. Thus, the velocity of the earth increases whilst it moves from the aphelion to perihelion, and decreases as much whilst it moves from perihelion to aphelion. As the moon moves in an ellipse about the earth in its focus, she must, in like manner by the earth's attraction, have her velocity increased from her apogee to perigee, and decreased as much from her perigee to apogee. These are the principal causes of the variation of the velocities of the earth and moon. But as the sun attracts the moon, as well as the earth attracts it, the attraction of

the sun will cause another variation of the moon's velocity. Thus the moon being attracted both by the sun and earth, they will cause great irregularities in her motion; and hence it is very difficult to compute the place of the moon. After finding the *mean* place of the moon, that is, the place where she would have been if her motion had been uniform, it requires not less than 20 corrections, in order to get the true place to a sufficient degree of accuracy. [Sir I. NEWTON was the first person who pointed out the sources of these irregularities; but they are of a nature too difficult to admit of a popular illustration.

108. When we view the moon with a telescope, we find that her surface is very rough with mountains and cavities; this appears from the very jagged boundary of the light and dark parts. Also, certain parts are found to project shadows always opposite to the sun; and when the sun becomes vertical to any of them, they are observed to have no shadow; these therefore must be mountains. Other parts are always dark on that side next the sun, and illuminated on the opposite side; these therefore must be cavities. Hence, the appearance of the moon constantly varies, from its altering its situation in respect to the sun. The tops of the mountains on the dark part of the moon, are frequently seen enlightened at a distance from the confines of the illuminated part. The dark parts have, by some, been thought seas; and by others, to be only a great number of caverns and pits, the dark sides of which next to the sun, would cause those places to appear darker than the rest. The great irregularity of the line bounding the light and dark parts, on every part of the surface, proves that there can be no very large tracts of water, as such a regular surface would necessarily produce a line, terminating the bright part, perfectly free from all irregularity. Also, if there was much water upon its surface, and an atmosphere, as conjectured by some astronomers, the clouds and vapours might easily be discovered by our telescopes, but no such phenomena have ever been observed.

109. On April 9, 1787, Dr. HERSCHEL discovered three volcanos in the dark part of the moon; two of them seemed to be almost extinct, but the third showed an actual eruption of fire, or luminous matter, resembling a small piece of burning charcoal covered by a thin coat of white ashes; it had a degree of brightness about it, as strong as that with which such a coal would be seen to glow in faint day light. The adjacent parts of the volcanic mountain seemed faintly illuminated by the eruption. A similar eruption appeared on May 4, 1783. On March 7, 1794, a few minutes before 8 o'clock in the evening, Mr. WILKINS of Norwich, an eminent architect, observed, with the naked eye, a very bright spot upon the dark part of the moon; it was there when he first looked at the moon; and the whole time he saw it, which was about 5 minutes, it was a fixed, steady light, except the moment before it disappeared, when its brightness increased. The same phenomenon was also observed by Mr. T. STRETTON, in St. John's-square, Clerkenwell, *London*. On April 13, 1793, M. PIAZZI, Astronomer-Royal, at *Palermo*, observed a bright spot on the dark part of the moon; and several other astronomers have observed the same phenomenon.

110. It has been a doubt amongst astronomers, whether the moon has any atmosphere; some suspecting that at an occultation of a fixed star by the moon, the star did not vanish suddenly, but lost its light gradually, and thence concluded, that the moon has an atmosphere. M. SCHROETER of *Lilienthan* in the *Dutchy of Bremen*, has endeavoured to establish the existence of an atmosphere, from the following observations. 1. He observed the moon when 2½ days old, in the evening soon after sun set, before the dark

part was visible; and continued to observe it till it became visible. Two cusps appeared tapering in a very sharp, faint, prolongation, each exhibiting its farthest extremity faintly illuminated by the solar rays, before any part of the dark hemisphere was visible; soon after, the whole dark limb appeared illuminated. This prolongation of the cusps beyond the semicircle, he thinks must arise from the sun's rays being refracted by the moon's atmosphere. He computes also the height of the atmosphere, which refracts light enough into the dark hemisphere to produce a twilight, more luminous than the light reflected from the earth when the moon is about 32° from the new, to be 1356 Paris feet; and that the greatest height capable of refracting the solar rays is 5376 feet. 2dly. At an occulation of *jupiter's* satellites, the third disappeared, after having been 1″ or 2″ of time indistinct; the fourth became indiscernible near the limb; this was not observed of the other two. See the *Phil. Trans.* 1792.

111. Many astronomers have given maps of the moon; but the most celebrated are those of HEVELIUS in his *Selenographia;* in which he has represented the appearance of the moon in its different states from the new to the full, and from the full to the new; these figures MAYER prefers. LANGRENUS and RICCIOLUS denoted the spots upon the surface, by the names of philosophers, mathematicians, and other celebrated men; giving the names of the most celebrated characters, to the largest spots. HEVELIUS marked them with the geographical names of places upon the earth. The former distinction is now generally used.

112. Very nearly the same face of the moon is always turned towards the earth, it being subject to only a small change within certain limits, those spots which lie near the edge appearing and disappearing by turns; this is called its *Libration.* The moon turns about its axis in the same direction in which it revolves in its orbit. Now the angular velocity about its axis is uniform, and it turns about its axis in the same time in which it makes a complete revolution in its orbit; if therefore the angular motion about the earth were also uniform, the same face of the moon would always be turned towards the earth. For if the moon had no rotation on her axis, when she is on opposite sides of the earth she would show different faces; but if, after she has made half a revolution in her orbit, she has also turned half round her axis, then the face which would otherwise have been shown, will be turned behind, and the same face will appear. And thus if the moon's angular velocity about her axis were always equal to her angular velocity in her orbit about the earth, the same side of the moon would be always towards the earth. But as the moon's angular velocity about her axis is uniform, and her angular velocity in her orbit is not uniform, their angular velocities cannot continue always equal, and therefore the moon will sometimes show a little more of her eastern parts, and sometimes a little more of her western parts; this is called a libration in *longitude.* Also, the moon's axis is not perpendicular to the plane of her orbit, and therefore at opposite points of her orbit, her opposite poles are turned towards the earth; therefore her poles appear, and disappear, by turns; this is called a libration in *latitude.*

113. Hence, nearly one half of the moon is never visible at the earth, and therefore nearly one half of its inhabitants (if it have any) never saw the earth, and nearly the other half never lose sight of it. Also, the time of its rotation about its axis being a month, the length of the lunar days and nights will be about a fortnight each.

114. It is a very extraordinary circumstance, that the time of the moon's revolution about her axis should be equal to that in her orbit.

Sir I. NEWTON, from the altitude of the tides upon the earth, has computed the altitude of the tides on the moon's surface to be 93 feet, and therefore the diamater of the moon perpendicular to a line joining the earth and moon, is less than the diameter directed to the earth, by 186 feet. Hence, says he, the same face must always be towards the earth, except a small oscillation; for if the longest diameter should get a little out of that direction, it would be brought into it again, by the earth's attraction. The supposition of D. DE MAIRAN is, that the hemisphere of the moon next the earth is more dense than the opposite one, and hence, the same face would be kept towards the earth, upon the same principle as before.

115. When the moon is in conjunction with the sun, she is then said to be *new*, and her dark side being next to the earth, she is then invisible. As she recedes from the sun, we first discover some of her bright part, and she appears *horned* till she gets 90° from the sun, when she appears half enlightened, or *dichotomised;* from thence till she comes into opposition, she appears above half enlightened, or *gibbous;* and at opposition she appears full orbed, the same face being then turned towards the earth which is towards the sun, and she is then said to be at her *full*. And from opposition to conjunction, her apparent bright part decreases as it before increased.

116. When the moon is about three days from the new, the dark part is very visible, by the light reflected from the earth, which is moon-light to the lunarians, considering our earth as a moon to them; and in the most favourable state, some of the spots may be then seen. But when the moon gets into quadratures, its great light prevents the dark part from being seen. According to Dr. SMITH, the strength of moon-light at the full moon, is 90 thousand times less than the light of the sun; but from experiments made by M. BOUGUER, he concluded it to be 300,000 times less. The light of the moon, condensed by the best mirrors, produces no sensible effect upon the thermometer. Our earth, in the course of a month, shows the same phases to the lunarians, as the moon does to us; the earth is at the full, at the time of the new moon, and at new, at the time of the full moon. The surface of the earth being about 13 times greater than that of the moon, it affords 13 times more light to the moon, than the moon does to us.

117. Dr. HERSCHEL has measured the height of a great many of the lunar mountains, and finds that, a few excepted, they generally do not much exceed half a mile. Before he measured them, they were reckoned much higher, being generally overrated. He observes, that it should be examined whether the mountain stands on level ground, which is necessary, that the measurement may be exact.

118. As the spectator is carried by the earth's rotation, his horizon will continually change its situation, and therefore it will continually cut the moon's orbit at different points till it has gone through the whole orbit; and the inclination of the orbit to the horizon will be continually changed. Now the difference between the times of the rising of the moon on two successive nights, will depend upon the angle which the moon's orbit makes with the horizon; the less the angle is, the less the moon will have descended below the horizon, at the time when the horizon is brought into the same situation it was 24 hours before; therefore when the angle which the moon's orbit makes with the horizon is the least, there will be the least difference of the times of her rising. Now, that angle is the least, when the first point of aries rises, at which time, in the latitude of *London*, there is only about 17 minutes difference of the moon's rising on two successive nights. Now, about the 22d of September, the first point of aries rises at the time the

moon rises, if the moon be then at the full, because it will then be at the the beginning of aries. In this case, therefore, the moon will rise about the full for several nights, with but a small difference of the times of her rising. This happening in the time of harvest, it is called the *harvest* moon. As the full moon may not happen on the 22d of September, that which happens nearest to it, is called the harvest moon. The same small difference of the times of rising of the moon, happens every month, but it not happening at the full moon, and at the time of the year, it is not taken notice of. The greatest difference of the times of the moon's rising at *London* on two successive nights, is about 1 hour and 17 minutes; and this happens when the moon is in the first point of libra, and therefore it happens at the *vernal* full moons.

119. There is a phenomenon called the *horizontal moon*, which is this, that it appears larger in the horizon than in the meridian; whereas, from its being farther from us in the former case than in the latter, it subtends a less angle when in the horizon. It is perhaps not easy to give a satisfactory answer to this deception. GASSENDUS thought that, as the moon was less bright in the horizon than in the meridian, we looked at it, in the former situation, with a greater pupil of the eye, and therefore it appeared larger. But this is not agreeable to the principles of optics, since the magnitude of the image upon the retina of the eye, does not depend upon the size of the pupil. DES CARTES thought that the moon appeared largest in the horizon, because, when comparing its distance with the intermediate objects, it appeared then farthest off; and as we judge its distance greater in that situation, we, of course, think it larger, supposing that it subtends the same angle. Dr. BERKLEY accounts for it thus: Faintness suggests the idea of greater distance; the moon appearing faintest in the horizon, suggests the idea of greater distance; and, supposing the angle the same, that must suggest the idea of a greater *tangible* object. He does not suppose the *visible* extension to be greater, but that the idea of a greater *tangible* extension is suggested, by the alteration of the visible extension. He says,—1st, That which suggests the idea of greater magnitude, must be something perceived; for that which is not perceived can produce no effect. 2dly, It must be something which is variable, because the moon does not always appear of the same magnitude in the horizon. 3dly, It cannot lie in the intermediate objects, they remaining the same; also, when these objects are excluded from sight, it makes no alteration. 4thly, It cannot be the visible magnitude, because that is least in the horizon. The cause therefore must lie in the visible appearance, which proceeds from the greater paucity of rays coming to the eye, producing *faintness*. Mr. ROWNING supposes that the moon appears farthest from us in the horizon, because the portion of the sky which we see, appears not an entire hemisphere, but only a portion of one; and hence we judge the moon to be further from us in the horizon, and therefore larger. Dr. SMITH, in his *Optics*, gives the same reason. The same circumstances take place in the sun. Also, if we take two stars near each other in the horizon, and two other stars near the zenith, at the same angular distance, the two former will appear at a much greater distance from each other, than the two latter. On this account, people are, in general, much deceived in estimating the altitudes of the heavenly bodies above the horizon, judging them to be much greater than they are. The lower part of a rainbow also appears much wider than the upper part; and this may be considered as an argument that the phenomenon cannot depend entirely upon the greater degree of faintness

of the object when in the horizon, because the lower part of the bow frequently appears brighter than the upper part, at the same time that it appears broader. Also, faintness can have no effect upon the angular distance of the stars; and as the difference of the apparent distance of the two stars, whose angular distance is the same in the horizon and the zenith, seems to be fully sufficient to account for the apparent variation of the moon's diameter in these sitituations, it may be doubtful whether the faintness of the object enters into any part of the cause.

120. The *mean* distance of the moon from the earth is about 239 thousand miles; and her semidiameter is nearly $\frac{3}{11}$ of the radius of the earth, or about 1081 miles. And as the magnitudes of spherical bodies are as the cubes of their radii, the magnitude of the moon: magnitude of the earth :: 3^3 : 11^3 :: 1 : 49 nearly.

ON THE ROTATION OF THE SUN AND PLANETS.

121. The times of rotation of the sun and planets are determined by the spots which are observed upon their surfaces; either by finding the arc which is described in a given time by a spot, or by observing how long it is in passing over the whole disc.

ON THE ROTATION OF THE SUN.

122. It is doubtful by whom the spots on the sun were first discovered. SCHEINER observed them in May, 1611, and published an account of them in 1612. GALILEO, in a publication in 1613, says, that being at *Rome*, in April 1611, he then showed the spots on the sun to several people, and that he had spoken of them some months before, to his friends at *Florence*. He imagined them to adhere to the sun. KEPLER says, they were observed by a son of DAVID FABRICIUS, who published an account of them in 1611. In the papers of HARRIOT, not yet published, it is said that spots upon the sun were observed in *December*, 1610. From observing the motion of the spots, the time of the sun's rotation is determined to be 25d. 14h. 8′.

123. Besides the dark spots upon the sun, there are also parts of the sun called *faculæ*, *lucili*, &c. which are brighter than the general surface; these abound most in the neighbourhood of spots, or where spots have lately been. Most of the spots appear within 30° of the sun's equator. On April 19, 1779, Dr. HERSCHEL saw a spot whose diameter was 1′. 8″, which is equal in length to more than 31 thousand miles; this was visible to the naked eye.

ON THE ROTATION OF THE PLANETS.

124. The *georgian* is at so great a distance, that astronomers have not been able to determine, whether it has any rotation about its axis.

125. *Saturn* was suspected by CASSINI and FATO, in 1683, to have a revolution about its axis; for they one day saw a bright streak, which disappeared the next, when another came into view near its disc. These streaks are called *belts*. In 1719, when the ring disappeared, CASSINI saw its shadow upon the planet, and a belt on each side, parallel to the shadow. Dr. HERSCHELL found that the arrangement of the belts always followed that of the ring. And during his observations on June 19, 20, and 21, 1780, he saw the same spot in three different situations; from all which he concluded that saturn revolved about an axis which is perpendicular to the plane of the ring. Another argument in support of its rotation, is, that the planet is an oblate spheroid, having the diameter in the direction of the ring, to the diameter perpendicular to it, as

11 to 10, according to the Doctor. The truth of this conjecture he afterwards verified, having determined that saturn revolves about its axis in 10h. 16′.

126. *Jupiter* is observed to have belts, and also spots, by which the time of its rotation has been determined. From a spot which CESSINI observed in 1665, he found the time of rotation to be 9h. 56′. From other spots in October 1691, he found the time 9h. 51′; and from other spots he determined the time to be 9h. 50′; and, in general, he found that the nearer the spots were to the equator, the quicker they revolved; from whence it is probable that the spots are not upon the body of jupiter, but in its atmosphere. Dr. HERSCHEL also found the time of rotation to vary, from different spots; and that the revolution of the same spots diminished; and observes that such a circumstance is agreeable to the theory of equinoctial winds, as it may be some time before the spot can acquire the velocity of the wind. Dr. POUND made the polar to the equatorial diameter as 12 : 13. Dr. BRADLEY made them as 12,5 : 13,5. Sir ISAAC NEWTON made them as $9\frac{1}{3}$: $10\frac{1}{3}$ by theory. The belts of jupiter are generally parallel to his equator, and are subject to great variations, both in respect to their number and figure; from which it is probable that they exist in the atmosphere.

127. GALILEO discovered the phases of *mars;* after which some *Italians* saw a spot in 1636. But in 1666, Dr. HOOK and M. CASSINI discovered some well defined spots, and the latter determined the time of rotation to be 24h. 40′. MARALDI made it 24h. 39′; and discovered a very bright part near the southern pole; but the brightness is subject to some change. Something like this has been seen about the north pole. Dr. HERSCHEL makes the time of rotation to be 24h. 39′. 21″,67. He also concludes, that mars has a considerable atmosphere.

128. GALILEO first discovered the phases of *venus*, in 1711. In 1666, CASSINI, at the time when venus was dichotomised, discovered a bright spot upon it, at its straight edge, and by observing its motion, he found the time of rotation to be 23h. 16′. M. SHROETER has endeavoured to show that venus has an atmosphere, from observing that the illuminated limb, when horned, exceeds a semicircle, as in the case of the moon; the cusps sometimes ran 15°. 19′ into the dark hemisphere. He makes the time of rotation 23h. 21′; and concludes from his observations, that they are very high mountains upon the surface.

129. The phases of *mercury* are easily distinguished, but no spots have yet been discovered, by which it can be ascertained whether it has any rotation.

ON THE ROTATION OF THE SATELLITES.

130. The *fifth* satellite of *saturn* was observed by M. CASSINI for several years as it went through the eastern part of its orbit, to appear less and less till it became invisible; and in the western part to increase again. These phenomena can hardly be accounted for, but by supposing some parts of the surface to be incapable of reflecting light, and therefore when such parts are turned towards the earth, they appear to grow less, or to disappear. And as the same circumstances always returned again when the satellite returned to the same part of its orbit, it affords a strong argument that the time of the rotation about its axis, is equal to the time of its revolution about its primary, a circumstance similar to the case of the moon. Dr. HERSCHEL has discovered that all the satellites of *jupiter* have a rotation about their axes, of the same duration as their respective periodic times about their primary.

ON THE SATELLITES OF JUPITER.

131. On January 8, 1610, GALILEO discovered the four satellites of jupiter, and called them *Medicean stars*, in honour of the family of the *Medici*, his patrons. This was a discovery of great importance, as it furnished a ready method of finding the longitude of places upon the earth's surface, by means of their eclipses. The eclipses led M. ROEMER to the discovery of the progressive motion of light; and hence, Dr. BRADLEY was enabled to solve an apparent motion of the fixed stars, which could not otherwise have been accounted for.

132. The satellites of jupiter in going from west to east are eclipsed by the shadow of jupiter, and as they go from east to west, they are observed to pass over its disc. Hence, they revolve about jupiter. The three first* satellites are always eclipsed when they are in opposition to the sun, and the length of their eclipses is found to vary; but sometimes the fourth satellite passes through opposition without being eclipsed. Hence it appears, that the planes of their orbits do not coincide with the plane of jupiter's orbit; for in that case, they would always pass through the centre of his shadow, and be always equally eclipsed at every opposition. The periodic times are as follows:

First				Second			
1d.	18h.	27′.	33″	3d.	13h.	13′.	42″

Third				Fourth			
7d.	3h.	42′.	33″	16d.	16h.	32′.	8″

133. The distances of the satellites from jupiter, in terms of the semi-diameter of jupiter, are as follows;

First	Second	Third	Fourth
5,965	9,494	15,141	26,63

134. The periodic times and distances of these satellites observe the same law as those of the primaries respecting the sun; that is, the squares of the periodic times have the same proportion to each other, as the cubes of their respective distances.

135. A satellite is sometimes hidden behind the body of jupiter without entering into its shadow; and this is called an *occultation*.

ON THE SATELLITES OF SATURN.

136. In the year 1665, HUYGENS discovered the fourth satellite of saturn. In 1671, Cassini discovered the fifth; in 1672, he discovered the third; and in 1684, he discovered the first and second. Dr. HERSCHEL has discovered a sixth and seventh satellite, which lie within the orbits of the other five. The

* The first satellite is that nearest to the planet, and the others in their order from it.

planes of the orbits of them all, except the fifth in order from the planet coincide very nearly with the plane of the right of the planet. Dr. HALLEY found that the orbit of the fourth (at that time discovered) was elliptical. The periodic times are as follows:

First	Second	Third	Fourth
22h. 37′. 23″	1d. 8h. 53′. 9″	1d. 21h. 18′ 27″	2d. 17h. 41′ 22″

Fifth	Sixth	Seventh
4d. 12h. 25′. 12″	15d. 22h. 41′ 12″	79d. 7h. 49′

137. Their distances from saturn, in terms of minutes and seconds of a degree, are as follows:

First	Second	Third	Fourth	Fifth	Sixth	Seventh
28″,7	36″,8	43″,5	56″	1′. 18″	3′. 0″	8′. 42″,5

138. The periodic times and distances observe the same law as those of jupiter; see art. 134.

ON THE SATELLITES OF THE GEORGIAN.

139. In 1787, Dr. HERSCHEL, the discoverer of the *georgian*, discevered two satellites belonging to it; and he determined the synodic revolution of one of them to be 8d. 17h. 1′. 19″,3, and of the other 13d. 11h. 5′, 1″,5; also, the distance of the former from the planet in minutes and seconds of a degree, was found to be 33″,09, and of the latter 44″,23. And since these discoveries were made, the doctor has discovered four more satellites; and found that the motions of them all are retrograde. Their orbits are nearly perpendicular to the plane of the ecliptic.

ON THE RING OF SATURN.

140. GALILEO was the first person who observed any thing extraordinary in *Saturn*. That planet appeared to him like a large globe between two small ones. In 1610 he announced this discovery; and continued his observations till 1612, when he was surprised to find only the middle globe. But afterwards he again discovered the globes on each side, which, in process of time, appeared to change their form. Upon this, HUYGENS set about improving the art of grinding object glasses; and made telescopes which magnified two or three times more than any which had been before made, with which he discovered the ring of saturn; and having observed it for some time, he published the discovery in 1656. The ring is broad and flat, at a distance from the planet, and edge-ways towards it. In 1675, CASSINI observed a dark line upon the ring, dividing it, as it were, into two rings, the inner of which appeared brighter than the outer. He also observed a dark belt upon the planet, parallel to the major axis of the ring; for though the ring is circular, yet, being seen obliquely, it appears an ellipse. Dr. HERSCHEL observes, that the black mark on the ring, is not in the middle of its breadth. The ring is no

less solid than the planet, and it is generally brighter than the planet. He takes notice of the extreme thinness of the ring, as he saw a satellite on the edge, hanging over on each side.

141. The ring is invisible when its plane passes through the earth, the sun, or between them. In the first case, the sun shines only on its edge, which is too thin to reflect light enough to render it visible; in the second case, the edge only being exposed to us, it is invisible for the same reason; in the third case, the dark side is towards us. Dr. HERSCHEL suspects that the ring is divided into two rings, for the following reasons: 1st, The black divisions on the two sides, are exactly in the same situations. 2dly, The divison on the ring, and the open space between the ring and the body, appear equally dark, and of the same colour as the heavens about the planet. Hence, he concludes, that saturn has two concentric rings, situated in one plane, the dimensions of which are in the following proportions:

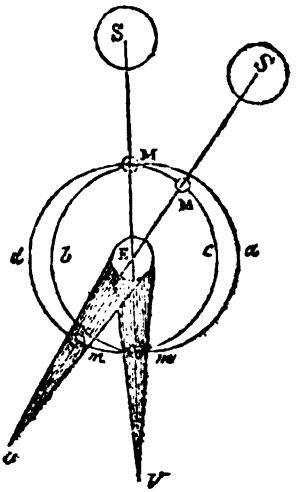
	Parts
Inside diameter of the smaller ring - - -	5900
Outside diameter - - - - - - - - - -	7510
Inside diameter of the larger ring - - - -	7740
Outside diameter - - - - - - - - - -	8300
Breadth of the inner ring - - - - - - -	805
Breadth of the outer ring - - - - - - -	280
Breadth of the space between the rings - -	115

From the mean of a great many measures of the outside diameter of the larger ring, Dr. HERSCHEL makes it 46″,677 at the mean distance of saturn; and hence, he finds the diameter of the ring to be 204883 miles; and the distance of the two rings 2839 miles.

ON ECLIPSES OF THE SUN AND MOON.

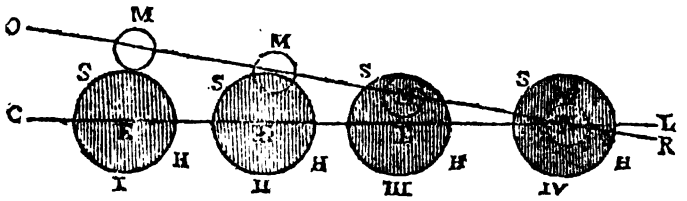
142. An eclipse of the *moon* is caused by its entering into the earth's shadow, and consequently it must happen at the *full* moon, or when she is in opposition to the sun, as the shadow of the earth must lie opposite to the sun. An eclipse of the *sun* is caused by the interposition of the moon between the earth and sun, and therefore it must happen when the moon is in conjunction with the sun, or at the *new* moon.

143. If the plane of the moon's orbit coincided with the plane of the ecliptic, there would be an eclipse at every conjunction and opposition; but the plane of the moon's orbit being inclined to the plane of the ecliptic, there can be no eclipse at conjunction or opposition, unless at that time the moon be at, or near the node.



For, let S, S' represent the sun in two different situations, E the

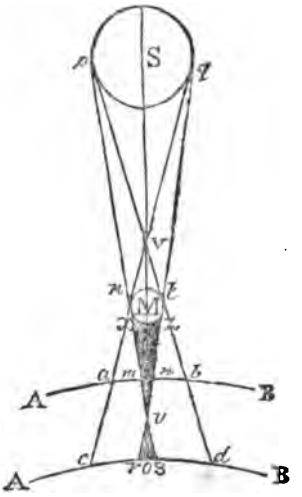
earth, and let the plane of the paper represent the plane in which the earth moves round the sun, or the ecliptic; and let *Mcmd* represent the moon's orbit, inclined to the ecliptic, and cutting it in two points *M*, *m*, in the line *SEV*, then *Mcm* is the line of the nodes, lying in conjunction and opposition, the sun being at S; and we must conceive half the orbit *Mcm* to lie above the paper, and the other half *mdM* to lie below it; describe also the circle *Mamb* on the paper; then these two circles *Mcmd*, *Mamb*, will be inclined to each other, like two hoops put one into the other, and inclined one to the other. Now if the moon be at *M* in conjunction with the sun *S*, the three bodies are then in the same plane, and in the same straight line, and therefore the moon is interposed between the sun and earth, and causes an eclipse of the sun. But if the sun be at *S'* and the moon in conjunction at *M'* she is then *out* of the plane of the ecliptic, the part *M'* lying *above* the plane of the paper or the ecliptic, and therefore the moon is not in the line joining *S'* and *E*; and *M'* may be so far from the node at *M*, that it may be so much elevated above the plane of the ecliptic, as not to interpose between *S'* and *E*, in which case there can be no eclipse of the sun. Whether, therefore, there will be an eclipse, or not, at conjunction, depends upon how far the moon at *M'* is distant from the node at *M*, at the time of conjunction. If the moon be at the node *m* at the time of opposition, the three bodies are then in the same straight line, and the moon must pass through the centre of the earth's shadow, and be totally eclipsed. But if at the time of opposition to the sun at *S'*, the moon be at *m'*, *m'* may be so far below the shadow *Ev* of the earth, that the moon may not pass through it, in which case there will be no eclipse. Whether therefore there will be a lunar eclipse at the moon's opposition, or not, depends upon how far the moon at *m'* is distant from the node at *m*, at that time. But if the plane *Mcmd* of the moon's orbit coincided with the plane of the ecliptic, or the plane of the paper, there would manifestly be a central interposition every conjunction and opposition, and consequently an eclipse. It is also evident, that the place of the earth seen from the sun is the same as the place of the earth's shadow, they both lying in the same line from the sun.



144. The different eclipses which may happen of the moon, may be thus explained. Let *CL* represent the plane of the ecliptic, *OR* the moon's orbit, cutting the ecliptic in the node *N*; and let *SH* represent a section of the earth's shadow at the distance of the moon from the earth, and *M* the moon at the time when it is in opposition to the sun; for as the earth's shadow is always opposite to the sun, when the moon passes by, or through the shadow, she must be in opposition. Hence, if the opposition happen as in position I, it is clear that the moon will just pass by the shadow of the earth without entering it, and there will be no eclipse. In position II, part of the moon will pass through the

earth's shadow, and there will be a *partial* eclipse. In position III, the whole of the moon passes through the earth's shadow, and there is a *total* eclipe. In position IV, the centre of the moon passes through the centre of the earth's shadow, and there is a *total* and *central* eclipse. It is plain, therefore, that whether there will, or will not be an eclipse at the time of opposition, depends upon the distance of the moon from the node at that time, or the distance of the earth's shadow from the node. Now it appears by calculation, that if EN be greater than 11°. 34′ at the time of opposition, there can be no eclipse; and when EN is less than that quantity there may be an eclipse. The distance EN (=11°. 34′) in position I, is called the *ecliptic limit* of a lunar eclipse. Or as (by the last article) the place of the earth's shadow is the same as the place of the earth seen from the sun, it is manifest, that if at the time of opposition we compute the place of the earth, and find it to be less than 11°. 34′, from the node, we know that there may be an eclipse; and then we may proceed to the calculation; but for that, we must refer the reader to the Treatise before mentioned, as we can here only explain the general principles.

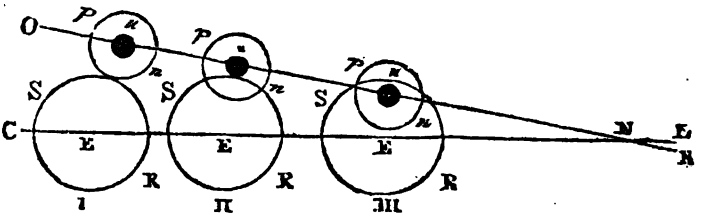
145. The phenomena of a solar eclipse, may be thus explained.



Let S be the sun, M the moon, AB or $A'B'$, part of the surface of the earth, for at different times the earth is at different distances from the moon; draw tangents *fxvs*, *qzvr*, from the sun to the *same* side of the moon, and *xvz* will be the moon's *umbra*, in which no part of the sun can be seen; and tangents

ptbd, *qwac*, be drawn from the sun to the *opposite* sides of the earth, the space comprehended between the umbra, and *wac*, *tbd*, is called the *penumbra*, in which only a part of the sun can be seen. Now it is manifest, that if *AB* be the surface of the earth, the space *mn*, where the umbra falls, will suffer a *total* eclipse; the parts *am*, *bn*, between the boundaries of the umbra and penumbra, will suffer a *partial* eclipse; but to all the other parts of the earth there will be no eclipse, no part of the sun being there hidden by the moon. Now let *A'B'* be the surface of the earth; then the space *rs* will suffer an *annular* and *partial* eclipe, the sun appearing all round the moon, in the form of a ring; the parts *cr*, *ds*, will suffer a *partial* eclipse; and the other parts of the earth will suffer no eclipe. In this situation of the earth, there can therefore be no total eclipse anywhere.

146. The umbra *xvz* is a cone, whose vertex is *v*; and the penumbra *wcdt* is the frustrum of a cone, whose vertex is *V*. Hence, if these be both cut through their common axis, and perpendicular to it, the section of each will be a circle, having a common centre in the axis, which is the line joining the centres of the sun and moon; and the section of the penumbra includes that of the umbra.



147. The different eclipses which may happen of the *sun*, may be thus explained. Let *CL* represent the orbit of the earth; *OR* the line described by the centres of the moon's umbra and penumbra at the earth; *N* the moon's node; *SR* the earth; *fm* the moon's penumbra, and *u* the umbra. Then in position I, the penumbra just passes by the earth, without falling upon it, and therefore there will be no eclipse. In position II, the penumbra falls upon the earth, but the umbra does not, therefore there will be a *partial* eclipse where the penumbra passes over, but no total eclipse. In position III, both the penumbra and umbra fall upon the earth; therefore where the umbra passes over, there will be a *total* eclipse; where the penumbra only passes over, there will be a *partial* eclipse; and to the other parts of the earth there will be no eclipse. It is manifest therefore that whether there will be an eclipse, or not, or whether it will be partial or total, depends upon the earth's distance from the node, at the time of conjunction. Now it appears by calculation, that, if at conjunction, *EN* be greater than 17°. 21′, there can be no eclipse, but if it be less, there may be one. The distance *EN* (=17°. 21′) in position I, is called the *ecliptic limit* of a solar eclipse.

148. The ecliptic limits of the sun are to those of the moon as 17°. 21′ to 11°. 34′, or nearly as 3 to 2, and hence there will be more solar than lunar eclipses, in about that ratio. But more lunar than solar eclipses are seen at any given place, because a lunar eclipse is visible to a whole hemisphere of the earth at

once; whereas a solar eclipse is visible to a part only, and therefore there is a greater probability of seeing a lunar than a solar eclipse. Since the moon is as long above the horizon as below, every spectator may expect to see half the number of lunar eclipses which happen.

149. If the earth had no atmosphere, when the moon was totally eclipsed, she would be invisible; but by the refraction of the atmosphere, some rays will be brought to fall on the moon's surface, on which account the moon is rendered visible, and of a dusky red colour.

150. An eclipse of the *moon* arising from a real deprivation of light, must appear to begin at the same instant of time to every place on that hemisphere of the earth which is next the moon. Hence, it affords a ready method of finding the longitudes of places upon the earth's surface, as will be afterwards explained.

151. The diameters of the sun and moon are supposed to be divided into 12 equal parts, called *digits*, and an eclipse is said to be so many digits, according to the number of those parts which are involved at the greatest darkness.

152. The greatest number of eclipses which can happen in a year is seven, and when this happens, five will be of the sun, and two of the moon. The least number which can happen is two, and these must be both solar; for in every year there must be two solar eclipses. The mean number in a year is about four.

153. In a total eclipse of the sun, the planets, and some of the brightest of the fixed stars, have been seen.

154. There are two seasons in the year when eclipses happen, that is, when the earth approaches near each node, as before shown; and as the nodes lie at opposite points of the earth's orbit, these seasons would be at the distance of half a year from each other, if the nodes were stationary; but as the nodes have a retrograde motion of about 19°. in a year, and the earth moves about a degree in a day, the seasons of eclipses will return at an interval of about 9 or 10 days less than half a year; so that if there be eclipses about the middle of January, the next eclipses may be expected about the first week of July.

ON THE NATURE AND MOTION OF COMETS.

155. Comets are solid bodies revolving in very excentric ellipses about the sun in one of the foci, and are subject to the same laws as the planets are; but they differ in appearances from them; for they are very faint bodies, and in some of them, as they approach the sun, a tail of light begins to appear, which increases till the comet comes to its perihelion, and then it decreases again, and vanishes. The ancient philosophers supposed them to be planets. ARISTOTLE says, that some *Italians* called *Pythagoreans*, say, that a comet is one of the planets. APOLLONIUS affirms, that the comets were, by the *Chaldeans*, reckoned amongst the planets, and had their periods. SENECA having considered the phenomena of two remarkable comets, believed them to be of equal duration with the world, though he was ignorant of the laws which governed them: and foretold, that future ages would unfold these mysteries. He recommended it to astronomers to keep a catalogue of them, in order to be able to determine whether they returned at certain periods. Notwithstanding this, most astronomers from his time to TYCHO BRAHE considered them only as meteors, existing in our atmosphere; but he, finding that they had no diurnal parallax, placed them above the moon. At length Sir I. NEWTON having proved that KEPLER's law, by which the motions of the planets are regulated, was a necessary consequence of his theory of gravity, it immediately followed, that comets

were governed by the same law; and the observations upon them agreed so accurately with his theory as to leave no doubt of its truth. Comets therefore revolve in very excentric ellipses about the sun in one of the foci. Astronomers, however, for the ease of calculation, suppose them to move in parabolic orbits, for that part which lies within the reach of observation, by which they can, with great accuracy, find the place of the perihelion; its distance from the sun; the inclination of the plane of its orbit to the ecliptic; and the place of the node, but not the periodic time.

156. Dr. HALLEY supposed that the comet which was observed by APIAN, in 1531, was the same as that which KEPLER and LONGOMONTANUS described in 1531; and the same as that which he observed in 1682; and having computed the effect of Jupiter upon it at that time, he found that it would increase its periodic time above a year; in consequence of which he predicted its return at the end of the year 1758, or the beginning of 1759. He informs us that he did not make his computations with the utmost accuracy; but his prediction was right, for it was seen on December 14, 1758, and passed its perihelion on March 13, 1759. Thus he had the glory of first foretelling the return of a comet.

157. Comets are not visible till they return into the planetary regions. They are surrounded with a very dense atmosphere, and from the side opposite to the sun, they frequently send forth a tail, which increases as the comet approaches its perihelion, immediately after which it is longest and most luminous, and then it is generally a little bent and convex towards those parts to which the comet is moving; the tail then decreases, and at last it vanishes. The smallest stars are seen through the tail, notwithstanding its great thickness, which shows that the matter of it is extremely rare. ARISTOTLE thought the tail to be a thin fiery vapour arising from the comet. APIAN, CARDNAN, TYCHO, and others supposed that the sun's rays being propagated through the transparent head of the comet, were refracted, as by a lens. But the figure of the tail does not answer to this. KEPLER supposed that the sun's rays carried off some of the gross parts of the comets. Sir I. NEWTON thought that the tail was a very thin vapour which the head, or nucleus of the comet, sends out by reason of its heat. Dr. HALLEY, in his description of the *Aurora Borealis* in 1716, says, "the streams of light so much resembled the long tails of comets, that at first sight they might be well taken for such." And afterwards, "this light seems to have a great affinity to that which the effluvia of electric bodies emit in the dark." D. DE MAIRAN calls the tail of a comet, the *Aurora Borealis* of the comet. This opinion Dr. HAMILTON supports by the following arguments. The Aurora Borealis has no effect upon the stars seen through it, nor has the tail of a comet. The atmosphere is known to abound with electric matter, and the appearance of the electric matter in vacuo, is exactly like the appearance of the Aurora Borealis, which, from its great altitude, may be considered to be in as perfect a vacuum as we can make. The electric matter in vacuo suffers the rays of light to pass through, without being affected by them. The tail of a comet does not spread itself sideways, nor does the electric matter. Hence, he supposes the tails of comets, the Aurora Borealis, and the electric fluid, to be matter of the same kind.

158. In respect to the nature of comets, Sir I. NEWTON observes, that they must be solid bodies, like the planets. For if they were nothing but vapours, they must be dissipated when they come near the sun. For the comet in 1680, when in its perihelion, was nearer to the sun than one-sixth of its diameter, therefore the heat of the comet at that time was to summer heat, as

28000 to 1. But the heat of boiling water is about 3 times greater than the heat which dry earth acquires from the summer sun; and the heat of red hot iron is about 3 or 4 times greater than the heat of boiling water. Therefore the heat of dry earth at the comet, when in its perihelion, was about 2000 times greater than red hot iron. By such heats, all vapours would be immediately dissipated.

159. This heat of the comet must be retained a long time. For a red hot globe of iron of an inch diameter, exposed to the open air, scarcely loses all its heat in an hour; but a greater globe would retain its heat longer, in proportion to its diameter, because the surface, at which it grows cold, varies in that proportion less than the quantity of hot matter. Therefore a globe of red hot iron as big as the earth, would scarcely cool in *50000* years.

160. From the beginning of our era, to this time, it is probable according to the best accounts, that there have appeared about 500 comets. Before that time, about 100 others are recorded to have been seen, but it is probable, that not above one half of them were comets.

ON THE FIXED STARS.

161. All the heavenly bodies beyond our system, are called *fixed stars*, because (some few excepted) they do not appear to have any proper motion of their own. From their immense distance, they must be bodies of very great magnitudes, otherwise they could not be visible; and when we consider the weakness of reflected light, there can be no doubt but that they shine with their own light. They are easily known from the planets, by their twinkling. Dr. HERSCHEL, by his late improvements in telescopes, has discovered that the number of fixed stars is great beyond all conception. In the *milky way*, he has, in a quarter of an hour, seen 116000 stars pass through his telescope, the field of view of which was only 15′ aperture. These stars, which can be of no use to us, are probably suns to other systems of planets.

162. From an attentive examination of the stars with good telescopes, many which appear only single to the naked eye, are found to consist of two, three, or more stars..... Dr. MASKELYNE had observed *α Herculis* to be a double star; and other astronomers have discovered many others to be double. Dr. HERSCHEL has found about 700, of which, not above 42 had been before observed. We will here mention a few of them.

α Herculis, a beautiful double star; the two stars very unequal; the largest is red, and the smallest blue, inclining to green.

γ Andromedæ, double, very unequal; the larger reddish white, the smaller a fine bright sky blue, inclining to green.

α Geminorum, double, a little unequal, both white.

β Lyræ, quadruple, unequal, white, but three of them a little inclined to red.

ι Bootis, double, very unequal, larger reddish, smaller blue, or rather a faint lilac.

υ Lyræ, treble, very unequal, larger white, smaller both dusky.

ε Lyræ, double, very unequal, larger a fine brilliant white, smaller dusky.

These are a few of the principal double, treble and quadruple stars mentioned by Dr. HERSCHEL in the *Phil. Trans.* 1785.

163. Several stars mentioned by the ancient astronomers are not now to be found; and several are now observed, which do not appear in their catalogues. The most ancient observation of a new star, is that by HIPPARCUS, about 120 years before J. C. which occasioned his making a catalogue of the fixed stars, in order that future astronomers might see what alterations had taken place since his time.

CORNELIUS GEMMA, on November 8, 1572, observed a new star in the *chair of cassiopea*. It exceeded *sirius* in brightness, and was seen at mid-day. It first appeared bigger than *jupiter*; but it gradually decayed, and after 16 months it entirely disappeared. It was observed by TYCHO, who found that it had no sensible parallax; and he concluded that it was a fixed star.

164. Many stars appear and disappear at certain periods. On August 13, 1596, DAVID FABRICIUS observed a new star in the *neck of the whale*. It disappeared after October in the same year. PHOCYLLIDES HOLWARDA discovered it again in 1637; and after it had disappeared for 9 months, he saw it again. BULLIALDUS determined the periodic time of its greatest brightness to be 333 days. Its greatest brightness is that of a star of the second magnitude, and its least, that of a star of the sixth.

165. In 1686, KIRCHIUS observed χ in the *swan* to be a changeable star, and found the period to be 405 days.

166. J. GOODRICKE, Esq. has determined the periodic variation of *algol*, or β *persei*, to be about 2d. 21h. Its greatest brightness is of the second, and least of the fourth magnitude. It changes from the second to the fourth, in about 3½ hours, and back again in the same time, and retains its full brightness for the remaining time. He also discovered that β *lyræ*, and δ *cephei* are subject to a periodic variation of brightness; the former in 12d. 19h. and the latter in 5d. 8h. 37½′.

167. E. PIGOTT, Esq. discovered η *antinoi* to be a variable star, with a period of 7d. 4h. 38′.

168. Dr. HERSCHEL in the *Phil. Trans.* 1783, has given a large collection of stars which were formerly seen, but are now lost: also a catalogue of variable stars, and of new stars.

169. There have been various conjectures to account for the variable appearance of the changeable stars. M. MAUPERTUIS supposes, that they may have so quick a motion about their axes, that their centrifugal forces may reduce them to flat oblate spheroids, not much unlike a mill-stone; and its plane may be inclined to the plane of the orbits of its planets, by whose attraction the position of the body may be altered, so that when its plane passes through the earth, it may be almost or entirely invisible, and become visible again as its broadside is turned towards us. Others suppose that considerable parts of their surfaces are covered with dark spots, which render the body invisible when they are turned towards us. Others conjecture that their disappearance may arise from dark bodies revolving about them, and interposing between them and us. The total disappearance of a star may probably be the destruction of its system; and the appearance of a new star, the creation of a new system of planets.

170. The fixed stars are not all evenly spread through the heavens, but the greater part of them are collected into clusters, which are discovered by high magnifying powers. With small powers they appear small whitish spots, called *nebulæ*. Some nebulæ however do not receive light from stars. HUYGENS discovered one in *orion's sword*; it consists only of 7 stars, and the other part is a bright spot. Dr. HALLEY, in the southern hemisphere discovered one in the *centaur*, which is not visible here. He also discovered another in *hercules*. CASSINI discovered one between the *great dog* and *the ship*, which he describes as full of stars. M. DE LA CAILLE discovered 42 nebulæ. But Dr. HERSCHEL has given us a catalogue of 2000 nebulæ and clusters of stars, which he himself has discovered. He has also discovered other phenomena in the heavens, which he calls *nebulous stars*, that is, stars surrounded with a faint luminous atmosphere, of a considerable extent.

ON THE CONSTELLATIONS.

171. The ancients divided the heavens into *constellations*, or collections of stars, and represented them by animals, and other figures, according as their disposition suggested. The number of the ancient constellations was 48, but the present number upon a globe is 70. Those stars which do not come into any of the constellations are called *unformed stars*. The stars visible to the naked eye, are divided into 6 classes, according to their magnitudes; the largest are called of the first magnitude, the next of the second, and so on. Those which cannot be seen by the naked eye, are called *telescopic* stars. The stars are marked upon the globes with Greek letters; the first letter of the Greek alphabet being put for the largest star of each constellation, and so on; and when more letters are wanted, the italic are generally used; this serves to point out the star, and they were first thus described by BAYER. The following catalogue contains the number of stars in each constellation, according to different astronomers.

THE ANCIENT CONSTELLATIONS.

		Ptolemy.	Tycho.	Hevelius.	Flamsteed.
Ursa minor	The little Bear	8	7	12	24
Ursa major	The great Bear	35	29	73	87
Draco	The Dragon	31	32	40	80
Cepheus	Cepheus	13	4	51	35
Bootes	Bootes	23	18	52	54
Corona borealis	The northern Crown	8	8	8	21
Hercules	Hercules kneeling	29	28	45	113
Lyra	The Harp	10	11	17	21
Cygnus	The Swan	19	18	47	81
Cassiopea	The Lady in the Chair	13	26	37	55
Perseus	Perseus	29	29	46	59
Auriga	The Waggoner	14	9	40	66
Serpentarius	Serpentarius	29	15	40	74
Serpens	The Serpent	18	13	23	64
Sagitta	The Arrow	5	5	5	18
Aquila	The Eagle	15	12	23	71
Antinous	Antinous		3	19	
Delphinus	The Dolphin	10	10	14	18
Equulus	The Horse's head	4	4	6	10
Pegasus	The flying Horse	20	19	38	89
Andromeda	Andromeda	23	23	47	66
Triangulum	The Triangle	4	4	12	16
Aries	The Ram	18	21	27	66
Taurus	The Bull	44	43	51	141
Gemini	The Twins	25	25	38	85
Cancer	The Crab	3	15	29	83
Leo	The Lion	35	30	49	95
Coma Berenices	Berenice's Hair		14	21	43
Virgo	The Virgin	32	33	50	110
Libra	The Scales	17	10	20	51

THE ANCIENT CONSTELLATIONS CONTINUED.

		Ptolemy	*Tycho*	*Hevelius*	*Flamstead*
Scorpius	The Scorpion - -	24	10	20	44
Sagittarius	The Archer - -	31	14	22	69
Capricornus	The Goat - - -	28	28	29	51
Aquarius	The Water-bearer -	45	41	47	108
Pisces	The Fishes - - -	38	36	39	113
Cetus	The Whale - - -	22	21	45	97
Orion	Orion - - - - -	38	42	62	78
Eridanus	Eridanus - - - -	34	10	27	84
Lepus	The Hare - - - -	12	13	16	19
Canis major	The great Dog - -	29	13	21	31
Canis minor	The little Dog - -	2	2	13	14
Argo	The Ship - - - -	45	3	4	64
Hydra	The Hydra - - -	27	19	31	60
Crater	The Cup - - - -	7	3	10	31
Corvus	The Crow - - -	7	4		9
Centaurus	The Centaur - -	37			35
Lupus	The Wolf - - - -	19			24
Ara	The Altar - - -	7			9
Corona australis	The southern Crown	13			12
Piscis australis	The southern Fish -	18			24

THE NEW SOUTHERN CONSTELLATIONS.

Columba Noachi	Noah's Dove - - -	10
Robur Carolinum	The Royal Oak - - -	12
Grus	The Crane - - -	13
Phœnix	The Phœnix - - - -	13
Indus	The Indian - - - -	12
Paos	The Peacock - - - -	14
Apus, *Avis Indica*	The Bird of Paradise -	11
Apis, *Musca*	The Bee, or Fly - -	4
Chamæleon	The Chameleon - - -	10
Triangulum australe	The south Triangle -	5
Piscis volans, *Passer*	The flying Fish - - -	8
Dorado, *Xiphias*	The sword Fish - - -	6
Toucan	The American Goose -	9
Hydrus	The water Snake - -	10

HEVELIUS'S CONSTELLATIONS, MADE OF THE UNFORMED STARS.

Lynx	The Lynx - -	19	44
Leo minor	The little Lion -		53
Asteron and Chara	The Greyhounds -	23	25
Cerberus	Cerberus . - -	4	
Vulpecula and Anser	The Fox and Goose	27	35
Scutum Sobieski	Sobieski's Shield -	7	
Lacerta	The Lizard - -		16
Camelopardalis	The Chamelopard	32	58
Monoceros	The Unicorn - -	19	31
Sextans	The Sextant - -	11	41

The constellations as far as the triangle, with Coma Berenices, are *northern*; those, after Pisces, in the ancient constellation, are *southern*. Besides the letters which are prefixed to the stars, many of them have names, as *sirius*, *regulus*, *arcturus*, &c.

ON THE PROPER MOTION OF THE FIXED STARS.

172. Dr. MASKELYNE, in the first volume of his *Observations*, remarks, that many, if not all the fixed stars, have small motions amongst themselves, called their *proper* motions. From comparing his own observations with those of preceding astronomers, he first determined the proper motions of *sirius*, *castor*, *procyon*, *pollux*, *regulus*, *arcturus*, and *α aquilæ*; afterwards he determined the proper motions of 35 stars in right ascension. These are given in a catalogue of the right ascensions of 36 principal stars, which he has determined to an extreme degree of accuracy, and which are now generally used as fundamental stars, in order to determine the right ascensions of all the other heavenly bodies. M. MAYER has determined the proper motion of 56 stars.

173. If the sun be in motion as well as the stars, it will alter their apparent motion. In whatever direction our system may be supposed to move, it is easy to see what effect it will have on the apparent motion of the stars. Dr. HERSCHEL finds, that if a point be assumed about the 77° of right ascension, and the sun to move from it, it will account for the proper motions in right ascension of the seven above-mentioned stars of Dr. MASKELYNE; and if, instead of supposing the sun to move in the equator, it should ascend to a point near to *λ herculis*, it will account for the observed change of declination of *sirius* and *arcturus*; he means, in respect to *direction*. He next observes, that this motion of the sun will account for many of the proper motions observed by MAYER. Also, *sirius* and *arcturus*, being the largest, are therefore probably the nearest, and hence, they ought to have the greatest apparent motion; and so we fi. they have. *Castor* is a double star; now, how extraordinary must such a concurrence appear, that two such stars should both have the same proper motion; for they are found to continue at the same distance from each other. This seems to point out the common cause, the motion of our system. From arguments of this kind, Dr. HERSCHEL thinks that the solar system is in motion, in the direction above mentioned.

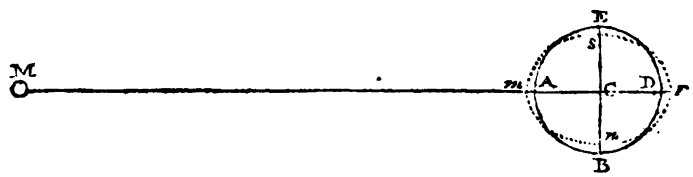
ON THE ZODIACAL LIGHT.

174. The *zodiacal light* is a pyramid of light which sometimes appears in the morning and evening, before sun rise, and after sun set. It has the sun for its basis, and in appearance resembles the *aurora borealis*. Its sides are not straight, but a little curved, resembling a lens seen edge-ways. It is generally seen in October and March, the twilight then being shortest. It was observed by CASSINI in 1683, a little before the vernal equinox, in the evening, extending along the ecliptic from the sun. He thinks that it had been observed before; for Mr. J. CHILDREY, in a book published in 1661, gives an account of a phenomenon which was probably the same. M. FATIO de DUILLIER observed it soon after CASSINI. In 1707, on April 3, it was observed by Mr. DERHAM, in *Essex*. It appeared about a quarter of an hour after sun set, and extended 15° or 20° above the horizon. It is generally supposed, that it is matter which is thrown off from the sun, by its rotation about its axis.

ON THE TIDES.

175. The true cause of the tides was discovered by KELEPR. He says that *gravity* is a power which is mutual between two bodies; and that the earth and moon would move towards each other, and meet at a point as much nearer to the earth than the moon, as the moon is less than the earth, if their motions in their orbits did not hinder them. And he further says, that the tides arise from the gravity of the waters towards the moon. Sir I. NEWTON, from his *Theory of Gravity*, has explained the general principles upon which the phenomena of the tides depend, from the unequal gravitation of the different parts of the earth towards the sun and moon.

176. If the earth were entirely fluid, and at rest, by the mutual gravity of its parts it must form itself into a perfect sphere. But if one part be attracted by a distant body more than another, the figure must necessarily be changed.



For let *ABDE* be the earth, supposed first to be a perfect sphere, and let *M* be a distant body attracting it; then as the force of attraction varies inversely as the square of the distance, the nearer parts of the earth to *M* will be more attracted than those further distant. The parts at *A* will therefore be more attracted towards *M* than those at the centre *C*, and those at the centre *C*, more than those at *D*; so that *A* will be drawn from *C*, and *C* from *D*; and the effect of drawing *C* from *D* is the same as that of drawing *D* from *C* in the opposite direction. It is manifest therefore, that the parts at *A* and *D* will recede from *C*; and, in general, all the parts of *EAB* which are nearer to *M* than *C* is, will be drawn from *C*; and all the parts of *EDB*, which are further from *M* than *C* is, will be left by *C*, or may be supposed to be drawn from *C* in the opposite direction. Thus, the waters will rise higher at *A* and *D*, and being drawn from *ECB* both ways, they must fall at *E* and *B*, and the earth will put on the elliptical form *mnrs*,

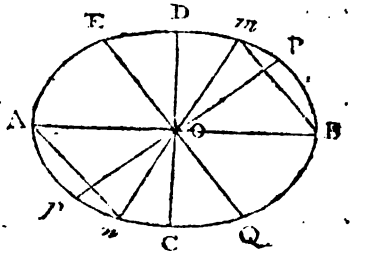
and make high tide at m and r, on opposite sides, at the same time; and there will be low tide at n and s at the same time, at two opposite points, which are 90° from the high tides. M may represent either the sun or moon; but the effect of the moon, from its nearness to the earth, is much greater than that of the sun; we consider therefore the moon as principally ruling the tides. As the earth turns about its axis once every day, every part of the earth will come once to the moon in a day, and once opposite to the moon, and therefore there will be two high tides every day, and the water will fall to its lowest, twice in a day. Or more accurately, the two tides happen in about 24h. 50′; for on account of the moon's motion in her orbit, it is that interval from the time the moon leaves the meridian till she returns to it the next time.

177. When the sun and moon are in conjunction, or in opposition to each other, they will both tend to raise the waters at the same places, and therefore the tides will then be the highest, and these are called *spring* tides; but when the sun and moon are 90° from each other, the sun will tend to depress those parts which the moon tends to raise, and therefore they opposing each other's effects, the tides will then be the lowest; and these are called *neap* tides. Hence, there will be the highest tides at new and full moon, and lowest when the moon is at her first and third quarters.

178. The water will continue to rise for some time after it has passed the moon, as the effect of the moon will continue though in a smaller degree, so that the water will not be the highest at the time when the moon is on the meridian, but it will sometimes happen, one, two, or three hours after, according to the circumstances which may oppose the motion of the waters.

179. Sir I. NEWTON has shown that the effect of the moon to raise the tides, increases as the cube of the distance decreases; hence, when the moon is at its least distance, the effect will be the greatest. The same is true in respect to the sun.

180. The tides are greatest when the attracting body, sun or moon, is in the equator.



For let, for instance, the moon be in the equator $ACBD$, and let A and B be the two points of high tide, and C and D the two points of low tide; then the axis of the earth being here perpendicular to the plane $ACBD$, a spectator at A or B, where it is high tide, will, by the earth's rotation, be carried to C or D, where it is low tide, and therefore the difference between OA and OC will express the difference of the heights of the water at high and low tide. Now suppose POp to be the earth's axis, EQ the equator, An, Bm, two parallels to it, the moon describing the parallel An. Then by the earth's rotation, the places A and B are carried from A to n, and from B to m, and then from n to A, and from m to B. Hence, the high tides to those two places are at A and B, and the low tides at n and m; therefore the difference between the height of the high and low tides will be the difference of OA and On, and of OB and Om; and as Om and On, are greater than OC, the difference of the tides is less here than when the moon was in the equator. Hence, the tides are highest when the moon is in the equator; and as the moon recedes from the equator, the tides diminish.

181. Hence, the highest tides are when the new or full moon happens at the time when the sun is in the equator, or about March 22d, and September the 22d, for then the moon, which is in conjunction with or opposition to the sun at those times, must also be in the equator. And if the moon be also then at its nearest distance, the tides will be the greatest of all.

182. That the tides may have their full effect, the surface of the earth ought to be covered with water; and hence, in large seas the effect is greatest. This is the reason that the tides are not so great in the torrid zone, between *Africa* and *America*, where the ocean is narrower, as in the temperate zones on either side. And from this we may understand why the tides are so small in islands that are very far distant from shores. In the Atlantic, the water cannot rise on one shore but by descending on the other; so that, at the intermediate distant islands, it will vary but a little from the mean height.

183. As the tides pass over shoals, and run through straits into bays of the sea, their motion becomes more various, and their heights depend on many circumstances. It is high water on the coasts of *Spain* and the west of *Ireland*, about 3 hours after the moon has passed the meridian. From thence it flows into the adjacent channels, as it finds the easiest passage. One current from it, for example, runs up by the south of *England*, another comes in by the north of *Scotland*. They take a considerable time to move all this way, and it is high water sooner in the places to which they first come; and it begins to fall at these places, whilst they are rising further on in their course. As they return they are not able to raise the tide, because the water runs faster off than it returns, till, by a new tide from the open ocean, the return of the current is stopped, and the water begins to rise again. The tide takes 12 hours to come from the ocean to *London*, so that when it is high water there, a new tide is already come into the ocean, and in some intermediate place, it must be low water at the same time. When the tides run over shoals, and flow upon flat shores, the water rises to a greater height than in the deep and open oceans; because the force of its motion cannot be broke upon level shores, till the water rises to a great height.

184. If a place communicate with two oceans, or two ways with the same ocean, one of which is a readier passage than the other, two tides may arrive at that place at different times, which interfering with each other, may produce a variety of phenomena. At *Batsha*, a port in the kingdom of *Tunquin*, in the *East Indies*, in latitude 20°. 50′ N. the day in which the moon passes the equator, the water stagnates without any motion: as the moon removes from the equator, the water begins to rise and fall once a day, and it is high water at the setting of the moon, and low water at her rising. This daily tide increases for about 7 or 8 days, and then decreases by the same degrees for the same time, till the motion ceases at the moon's return to the equator. When she has passed the equator, and declines southward, the water rises and falls again as before; but it is high water now at the rising, and low at the setting of the moon.

185. Sir I. NEWTON thus accounts for this phenomenon. To *Batsha* there are two inlets, one from the *Chinese* Ocean between the Continent and the *Manillas*, the other from the *Indian* Ocean between the Continent and *Borneo*; and he supposes that a tide may arrive at *Batsha*, through one of these inlets, at the third hour of the moon, and the other through the other inlet 6 hours after. For whilst these tides are equal, the one flowing out as the other flows in, the water must stagnate. Now they are equal when the moon is in the equator; but when the moon gets on

the same side of the equator with *Batsha*, the daily tide exceeds the nightly, so that two greater and two less tides must arrive at *Batsha* by turns. The difference of these will produce an agitation of the water, which will rise to its greatest height at the mean time between the two greatest tides, and fall lowest at the mean time between the two least tides; so that it will be high water about the sixth hour at the setting of the moon, and low water at her rising. When the moon gets on the other side of the equator, the nightly tide will exceed the daily, and therefore the high tide will be at the rising, and the low tide at the setting of the moon. The same principles will account for other extraordinary tides which are observed.

186. There are no tides in lakes, because they are generally so small, that the moon attracts every part of them equally, and therefore no part of the water is raised above the other. The *Mediterranean* and *Baltic* Seas have very small tides, because the inlets by which they communicate with the ocean are so narrow that they cannot, in so short a time, receive or discharge enough to raise or sink their surfaces sensibly. In the *Mediterranean*, the tides produce a variation of about 1 foot in the height of the waters.

TO FIND THE LONGITUDE OF PLACES UPON THE EARTH'S SURFACE.

187. The situation of a place upon the surface of the earth, is determined from its latitude and longitude. The methods of finding the latitude we have already explained; but the longitude cannot be so readily found.* *Philip* III, king of *Spain*, was the first person who offered a reward for its discovery; and the *states* of *Holland* soon after followed his example. During the minority of LEWIS XV of *France*, the regent power promised a great reward to any person who should discover the longitude at sea. In the time of CHARLES II, the Sieur de St. PIERRE, a Frenchman, proposed a method of finding the longitude by the moon. Upon this, a commission was granted to Lord Viscount BROUNKER, president of the Royal Society, Mr. FLAMSTEAD, and several others, to receive his proposals, and give their opinions respecting it. Mr. FLAMSTEAD gave his opinion, that if we had the places of the fixed stars, and tables of the moon's motion, we might find the longitude, but not by the method of the Sieur de St. PIERRE. Upon this, Mr. FLAMSTEAD was appointed astronomer royal, and an observatory was built at Greenwich for him; and the instructions to him and his successors were, "that they should apply themselves with the utmost care and diligence, to rectify the tables of the motions of the heavens, and the places of the fixed stars, in order to find out the so much desired longitude at sea, for the perfecting of the Art of Navigation."

188. In the year 1714, the *British* parliament offered a reward for the discovery of the longitude; the sum of 10,000*l.* if the method determined the longitude to 1° of a great circle, or to 60 geographical miles; of 15,000*l.* if it determined it to 40 miles; and of 20,000*l.* if it determined it to 30 miles; with this proviso, that if any such method ex-

* In many of the old maps, the first meridian is made to pass through *Ferro* in the Canaries, which is 17°. 45′. 50″ west of Greenwich. To reduce therefore the longitude from Ferro to that from Greenwich, *add* 17°. 45′. 50″ if the place be *west* of Ferro, and it gives the longitude west from Greenwich; if the place be *east* of Ferro, and in longitude *less* than 17°. 45′. 50″, the difference of its longitude and 17°. 45′, 50″, shows the longitude west from Greenwich; but if the longitude be *greater* than 17°. 45′. 50″, the difference shows the longitude east of Greenwich. Thus you may reduce the longitude from one place to that from any other.

tend no further than 30 miles adjoining to the coast, the proposer should have no more than half the rewards. The act also appoints the first Lord of the Admiralty, the Speaker of the House of Commons, the first Commissioner of Trade, the Admirals of the Red, White and Blue Squadrons, the Master of Trinity House, the President of the Royal Society, the Royal Astronomer at Greenwich, the two Savilian Professors at Oxford, and the Lucasian and Plumian Professors at Cambridge, with several other persons, as Commissioners for the Longitude at Sea. The Lowndian Professor at Cambridge was afterwards added. After this act of parliament, several other acts passed in the reigns of GEORGE II and III, for the encouragement of finding the longitude. At last, in 1774, an act passed, repealing all other acts, and offering separate rewards to any person who should discover the longitude, either by the watch keeping true time within certain limits, or by the lunar method, or by any other means. The act proposes as a reward for a time-keeper, the sum of 5000*l.* if it determine the longitude to 1° or 60 geographical miles; the sum of 7,500*l.* if it determine it to 40 miles; and the sum of 10,000*l.* if it determine it to 30 miles, after proper trials specified in the act. If the method be by improved solar and lunar tables, constructed upon Sir I. NEWTON's Theory of Gravitation, the author shall be entitled to 5000*l.* if such tables shall show the distance of the moon from the sun and stars, within fifteen seconds of a degree, answering to about seven minutes of longitude, after allowing half a degree for the errors of observation. And for any other method, the same rewards are offered as those for timekeepers, provided it gives the longitude true within same limits, and be practicable at sea. The commissioners have also a power of giving smaller rewards, as they shall judge proper, to any one who shall make any discovery for finding the longitude at sea, though not within the above limits. Provided however, that if such person or persons shall afterwards make any further discovery as to come within the abovementioned limits, such sum or sums as they may have received, shall be considered as part of such greater reward, and deducted therefrom accordingly.

189. After the decease of Mr. FLAMSTEAD, Dr. HALLEY, who was appointed to succeed him, made a series of observations on the moon's transit over the meridian, for a complete revolution of the moon's apogee, which observations being compared with the computations from the tables then extant, he was enabled to correct the tables of the moon's motions. And as Mr. HADLEY had then invented an instrument by which the altitudes and distances of the heavenly bodies could be taken at sea, Dr. HALLEY strongly recommended the lunar method of finding the longitude.

TO FIND THE LONGITUDE BY A TIME-KEEPER.

190. The sun appears to move round the earth from east to west, or to describe 360°, in 24 hours, and therefore he appears to move 15° in an hour. If therefore the meridians of two places, make an angle of 15° with each other, or if the two places differ 15° in longitude, the sun will come to the eastern meridian 1 hour before it comes to the western meridian, and therefore when it is 12 o'clock at the former place, it is only 11 at the latter; and in general, the difference between the times by the clock at any two places, will be the difference of their longitudes, converted into time at the rate of 15° for an hour, the time at the eastern place being the forwardest. If therefore we can tell what o'clock it is at any two places, at the same instant of time, we can find the difference of

their longitudes, by allowing 15° for every hour that the clocks differ.

191. Let therefore the time-keeper be well regulated and set to the time at *Greenwich*, that being the place from which we reckon our longitude; then if the watch neither gains nor loses, it will always show the time at *Greenwich*, wherever you may be. Now to find the time by the clock at any other place, take the sun's altitude, and thence find the time by article 61; now the time thus found is *apparent* time, or that found by the sun, which differs from the time shown by the clock by the *equation of time*, as we have shown in article 79; we must therefore apply the equation of time to the time found by the sun, and we shall get the time by the clock; and the difference between the time by the clock so found, and the time by the time-keeper, or the time at *Greenwich*, converted into degrees at the rate of 15° for an hour, gives the longitude of the place from *Greenwich*. For example, let the time by the time-keeper, when the sun's altitude was taken, be 6h. 19′, and let the time deduced from the sun's altitude be 9h. 27′, and suppose at that time the equation of time to be 7′, showing how much the sun is that day behind the clock, then the time by the clock is, 9h. 34′, the difference between which and 6h. 19′ is 3h. 15′; and this converted into degrees, at the rate of 15° for 1 hour, gives 48°. 45′. the longitude of the place from *Greenwich*; and as the time is forwarder than that at *Greenwich*, the place lies to the *east* of *Greenwich*. Thus the longitude could be very easily determined, if you could depend upon the time-keeper. But as a watch will always gain or lose, before the time-keeper is sent out, its gaining or losing every day for some time, a month for instance, is observed; this is called the *rate of going* of the watch, and from thence the *mean* rate of going is thus found.

192. Suppose I examine the rate of a watch for 30 days; on some of those days I find it has gained, and on some it has lost; add together all the quantities it has gained, and suppose they amount to 17″; add together all the quantities it has lost, and suppose they amount to 13″, then, upon the whole, it has gained 4″ in 30 days, and this is called the *mean* rate for that time, and this divided by 30, gives 0″,133 for the *mean daily* rate of gaining; so that if the watch had gained regularly 0″,133 every day, at the end of the 30 days it would have gained just as much as it really did gain, by sometimes gaining and sometimes losing. Or you may get the *mean daily* rate thus. Take the *difference* between what the clock was too fast, or too slow, on the first and last days of observation, if it be too fast, or too slow, on each day; but take the *sum*, if it be too fast on one day and too slow on the other, and divide by the number of days between the observations, and you get the mean daily rate. Thus, if the watch was too fast on the first day 18″, and too fast on the last day 32″, the *difference* 14″ divided by 30 gives 0″,466 the *mean daily* rate of gaining. But if the watch was too fast on the first day 7″, and too slow on the last day 10″, the *sum* 17″ divided by 30 gives 0″,566 the *mean daily* rate of losing. After having thus got the mean daily rate of gaining or losing, and knowing how much the watch was too fast or too slow at first, you can tell, according to that rate of going, how much it is too fast or too slow, at any other time. In the first case, for instance, let the watch have been 1′. 17″ too fast at first, and I want to know how much it is too fast 50 days after that time; now it gains 0″,133 every day, if this be multiplied by 50 it gives 6″,65 for the whole gain in 50 days; therefore at the end of that time the watch would be 1′. 23″,65 too fast. This would be the error, if the watch continued to gain at the

above rate; and although, from the different temperatures of the air, and the imperfection of the workmanship, this cannot be expected, yet the probable error will by this means be diminished, and it is the best method we have to depend upon. In watches which are under trial at the Royal Observatory at *Greenwich*, as candidates for the rewards, this allowance of a mean rate is admitted, although it is not mentioned in the act of parliament; the commissioners however are so indulgent as to grant it, which is undoubtedly favourable to the watches.

193. As the rate of going of a watch is subject to vary from so many circumstances, the observer, whenever he goes ashore, and has sufficient time, should compare his watch for several days with the true time found by the sun, by which he will be able to find its rate of going. And when he comes to a place whose longitude is known, he may then set his watch again to *Greenwich* time; for when the longitude of a place is known, you know the difference between the time there and at *Greenwich*. For instance, if he go to a place known to be 30° east longitude from *Greenwich*, his watch should be 2 hours slower than the time at that place. Find therefore the true time at that place, by the sun, and if the watch be 2 hours slower, it is right; if not, correct it by the difference, and it again gives *Greenwich* time.

194. In long voyages, unless you have sometimes an opportunity of adjusting the watch to *Greenwich* time, its error will probably be considerable, and the longitude deduced from it, will be subject to a proportional error. In short voyages, a watch is undoubtedly very useful; and also in long ones, where you have the means of correcting it from time to time. It serves to carry on the longitude from one known place to another, supposing the interval of time not very long; or to keep the longitude from that which is deduced from a lunar observation, till you can get another. Thus the watch may be rendered of great service in navigation.

TO FIND THE LONGITUDE BY AN ECLIPSE OF THE MOON, AND OF JUPITER'S SATELLITES.

195. By an eclipse of the *moon*. This eclipse begins when the umbra of the earth first touches the moon, and ends when it leaves the moon. Having the times calculated when the eclipse begins and ends at *Greenwich*, observe the times when it begins and ends at the place where you are; and the difference of these times, converted into degrees, gives the difference of the longitudes. For as the phases of the moon in an eclipse, happen at the same instant at all places, the difference of the times at different places when the same phase is observed, arises from the difference of the clocks at those places, and that difference (as before observed) converted into degrees, gives the difference of longitudes. If the beginning of an eclipse happen at 6 o'clock at one place, and at 8 o'clock at another, these places differ 2 hours, or 30°, in longitude. This would be a very ready and accurate method, if the times of the first and last contact of the earth's umbra and the moon could be accurately observed; but the darkness of the penumbra continues to increase till it comes to the umbra, so that until the umbra actually gets upon the moon, it is not discovered. The umbra itself is also badly defined. The beginning and end of a lunar eclipse, cannot, in general, be determined nearer than 1′ of time, and often not nearer than 2′ or 3′. Upon these accounts, the longitude, thus deduced, is subject to a considerable degree of uncertainty. Astronomers therefore determine the difference of longitudes of two places, by corresponding observa-

tions of other phases, that is, when the umbra bisects any spots upon the surface. And this can be determined to a greater degree of accuracy, than the beginning and end; for when the umbra is got upon the moon's surface, the observer has leisure to consider and fix upon the proper line of termination, in which he will be assisted by running his eye along the circumference of the umbra. Thus the coincidence of the umbra with the spots, may be observed to a considerable degree of accuracy. The observer therefore should have a good map of the moon at hand, that he may not mistake. The telescope to observe a lunar eclipse, should have but a small magnifying power with a great quantity of light. The shadow comes upon the moon on the east side, and goes off on the west; but if the telescope invert, the appearance will be the contrary.

196. Thee clipses of jupiter's satellites afford the readiest method of determining the longitude of places upon land. It was also hoped, that some method might be invented to observe them at sea, and Mr. IRWIN made a chair to swing for that purpose, for the observer to sit in; but Dr. MASKELYNE, in a voyage to *Barbadoes*, under the direction of the commissioners of longitude, found it totally impracticable to derive any benefit from it; and he observes, that "considering the great power requisite in a telescope for making these observations well, and the violence as well as the irregularities of the motion of the ship, I am afraid the complete management of a telescope on ship board, will always remain among the desiderata. However, I would not be understood to mean to discourage any attempt, founded on good principles, to get over the difficulty." The telescopes proper for making these observations, are common refracting ones from 15 to 20 feet; reflecting ones of 18 inches or 2 feet; or the 46 inches achromatic. On account of the uncertainty of the theory of the satellites, Dr. MASKELYNE advises the observer to be settled at his telescope, 3 minutes before the expected time of immersion of the first satellite; 6′ or 8′ before that of the second or third; and a quarter of an hour before that of the fourth. And if the longitude of the place be also uncertain, he must look out proportionably sooner. Thus, if the longitude be uncertain to 2°, answering to 8 minutes of time, he must begin to look out 8 minutes sooner than is mentioned above. However, when he has observed one eclipse and found the error of the tables, he may allow the same correction to the calculations of the *Ephemeris* for several months, which will advertise him very nearly of the time of expecting the eclipses of the same satellite, and dispense with his attending so long. *Before* the opposition of jupiter to the sun, the immersions and emersions happen on the *west* side of jupiter; and *after* opposition, on the *east* side; but if the telescope invert, the appearance will be the contrary. *Before* opposition, the *immersions* only of the first satellite are visible; and *after* opposition, the *emersions* only. The same is generally the case in respect to the second satellite; but both immersion and emersion are frequently observed in the third and fourth.

197. When the observer is waiting for an emersion, as soon as he suspects that he sees it, he should look at his watch and note the second; or begin to count the beats of the clock, till he is sure it is the satellite, and then look at the clock and subtract the number of seconds which he has counted, and he will have the time of emersion. If jupiter be 8° above the horizon, and the sun as much below, an eclipse will be visible; this may be determined near enough by a common globe.

198. The emersion or immersion being observed according to apparent time, the longitude of the place from *Greenwich* is found, by

taking the difference between that time and the time set down in the *Nautical Almanac*, which is calculated for *apparent* time.

Ex. Suppose the emersion of a satellite to have been observed at the *Cape of Good Hope*, May 9, 1767, at 10h. 46′. 45″ apparent time; now the time in the *Nautical Almanac* is 9h. 33′. 12″; the difference of which time is 1h. 13′. 33″ the longitude of the Cape *east* of Greenwich in time, or 18°. 23′. 15″.

199. But to find the longitude of a place from an observation of an eclipse of a satellite, it is better to compare it with an observation made under some well-known meridian, than with the calculations in the *Ephemeris*, because of the imperfection of the theory; but where a corresponding observation cannot be obtained, find what correction the calculations in the Ephemeris require, by the nearest observations to the given time that can be obtained; and this correction applied to the calculation of the eclipse in the *Ephemeris*, renders it almost equivalent to an actual observation. The observer must be careful to regulate his clock or watch to apparent time, or at least to know the difference.

200. In order the better to know the difference of longitudes of two places, from corresponding observations, the observer should be furnished with the *same* kind of telescopes. For at an immersion, as the satellite enters the shadow, it grows fainter and fainter, till at last the quantity of light is so small that it becomes invisible, even before it is wholly immersed in the shadow; the instant therefore that it becomes invisible will depend upon the quantity of light which the telescope receives, and its magnifying power. The instant therefore of its appearance will be later, the better the telescope is; and the sooner it will appear at its emersion. Now the immersion is the instant the satellite is got into the shadow, and the emersion is the instant before it begins to emerge from the shadow; if therefore two telescopes show the disappearance or appearance of the satellite at the same distance of time from the immersion or emersion, the difference of the times will be the same as the difference of the true times of immersion or emersion, and therefore will show the difference of longitudes accurately. But if the observed time at one place and the computed time at another be compared, we must allow for the difference of the apparent and true times of immersion and emersion, in order to get the true time where the observation was made, to compare with the true time from computation at the other place. This difference may be found, by observing an eclipse at any place whose longitude is known, and comparing it with the time by computation. Observers, therefore, should settle the difference by the mean of a great number of observations thus compared with the computations, by which means the longitude will be more accurately ascertained. After all, however, the different states of the air, and of the eye, will cause some uncertainty; but the latter may in a great measure be obviated, if the observer remove himself from all warmth and light, for a little time before he observes.

TO FIND THE LONGITUDE BY THE MOON'S DISTANCE FROM THE SUN, OR A FIXED STAR.

201. The steps by which we find the longitude by this method, are these:

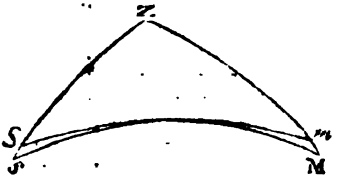
1. From the observed altitudes of the moon and the sun, or a star, and their *observed* distance, find their *true* distance.

2. From the *Nautical Almanac* find the apparent time at *Greenwich* when the moon was at that distance.

3. From the altitude of the sun or star, find the apparent time at the place of observation.

4. The difference of the times thus found, gives the difference of the longitudes, or the longitude from *Greenwich*.

We will here fully explain each of these.



Let *Z* be the zenith of the place of observation, *M* the apparent place of the moon, *m* its true place, *S* the apparent place of the sun or star, *s* the true place; then as the parallax of the moon depresses it more than refraction raises it, the apparent place *M* is below the true place *m*; but the star is elevated by refraction and has no parallax to depress it, and the sun is more elevated by refraction than depressed by parallax, therefore the true place *s* is below the apparent place *S*. Now the apparent altitudes being found by observation, we know the apparent zenith distances *ZM*, *ZS*; and knowing their apparent distance *MS*, we know the three sides of the triangle *ZSM*; hence, we can find the angle *Z*. Now find from the tables the parallax and refraction of the moon, and their difference is *Mm*; do the same for the sun, and we get *Ss*, or if it be a star, the refraction gives *Ss*. From *ZM* subtract *Mm*, and we get *Zm*, and to *ZS* add *Ss*, and we get *Zs*; hence, in the triangle *Zsm*, we know *Zs*, *Zm*, and the angle *Z*, to find *sm* the *true* distance of the moon from the sun or star.

Example. Suppose on June 29, 1793, the sun's apparent zenith distance *ZS* was observed to be 70°. 56′. 24″, the moon's apparent zenith distance *ZM* to be 48°. 55′. 58″, and their apparent distance *MS* to be 103°. 29′. 27″. Then the true distance *sm* being computed according to the above method, it is found to be 103°. 3′. 18″.

202. The true distance of the moon from the sun being found, the next thing is to find from thence, the time at *Greenwich*. Now in the *Nautical Almanac* the true distance of the moon from the sun or certain fixed stars, such as lie in or near the moon's path, is put down for every three hours. The true distance therefore being known, look into the *Nautical Almanac*, and take out two distances, one greater and the other less than the known true distance as found above, and the difference *D* of these distances shows how much the moon approaches to or recedes from the sun or star, in three hours; and take the difference *d* between the moon's distance at the beginning of that interval, and the distance found from observation, and then say, *D* : *d* :: 3 hours: the time the moon is acceding to or receding from the sun or star through the space *d*, which added to the time at the beginning of the interval, gives the apparent time at *Greenwich*, corresponding to the true distance of the moon, as deduced from observation.

Example. Taking the moon's true distance 103°. 3′. 18″ on June 29, 1793, as deduced in the last example, to find the apparent time at Greenwich.

True distance of ☽ from ☉ - - - - - - - - -	105°.	3′.	18″
True distance on June 29, at 3h. by *Nautical Almanac*	103.	4.	58
True distance on June 29, at 6h. by *Nautical Almanac*	101.	26.	42
D = -	1.	38.	16
d = -	0.	1.	40

Hence, 1°. 38′. 16″ : 0°. 1′. 40″ :: 3h : 0h. 3′. 3″, which added to 3 hours gives 3h. 3′. 3″ the apparent time at *Greenwich*.

203. The next thing to be done, is to find the time at the place of observation, knowing the sun's declination, the latitude of the place, and the sun's altitude.

Example. The sun's declination was 23°. 14′. 4″, and its observed altitude was 19°. 3′. 36″, and the latitude was 52°. 12′. 35″.

Now the refraction was 2′. 44″, and the parallax 8″; hence, the true altitude was 19°. 1′; and by article 61, the apparent time is found to be June 28, 18h. 5′. 29″.* Hence,

Apparent time at Greenwich, June 29 - - - - - - -	3h.	3′.	3″
Apparent time at place of observation, June 28 - - - -	18.	5.	29
Longitude of place of observation in time - - - - -	8.	57.	34

Which converted into degrees, gives 123°. 50′. 16″, the *longitude* of the *place of observation* west of *Greenwich*.

204. Thus we have explained the regular steps by which the longitude is found by observing the moon's distance from the sun, or a fixed star; but for a full explanation, we refer the reader to Mr. VINCE's *Complete System of Astronomy*, in which work he will find all the various calculations explained at large; and where he will also see three other methods of finding the longitude; one, by a solar eclipse; another, by an occultation of a fixed star by the moon; and a third, by the moon's transit over the meridian, compared with that of a fixed star. These are of too difficult a nature to admit of a popular explanation.

205. The above method of finding the longitude by the moon, was brought into practice by Dr. MASKELYNE, who proved the accuracy of it in two voyages, one to *St. Helena*, and the other to *Barbadoes*, by the following irrefragible proofs: 1st, On the near agreement of the longitude, inferred from observations made within a few days or hours of making land, with the known longitude of such land. 2d, From the near agreement of the longitude of the ship from observations made on a great many different days near to one another, when connected by help of the common reckoning. 3d, From the near agreement of the longitude of the ship, deduced from observations of stars on different sides of the moon, taken on the same night. For here all the most probable kinds of errors operating different ways, their effect, if any, must have appeared in the result. But in all the double longitudes thus found, their differences were so small, as to warrant him to say, that by good instruments and careful observers, the longitude may be thus found to a very great degree of accuracy.

ON THE USE OF THE GLOBES.

206. There are two globes, one called the *terrestrial*, upon which the places of the earth are delineated, and the other called *celestial*, upon which all the principal fixed stars are put down, and the figures of the constellations. The terrestrial globe is a perfect map of the earth, representing the relative situations of all the places upon its surface, with the true figures of all

* The astronomical day begins at noon, so that June 28, 18h. 5′. 29″ is, according to the common reckoning, June 29, 6h. 5′. 29″ in the morning.

the different countries, which cannot be properly represented upon a map; and this renders a terrestrial globe very necessary for the study of geography. The celestial globe serves to explain all the phenomena arising from the diurnal motion of the earth about its axis, and also the variation of seasons arising from its motion about the sun, only supposing the sun to move in the ecliptic instead of the earth, which will not alter any of the appearances. To each globe there is a circular, flat piece of wood, the plane of which passes through the centre of the globe, on which are marked the days of the month, and corresponding to them the signs of the ecliptic, where the sun is on those days; the points of the compass are also put upon the same piece. This is called the *horizon;* at right angles to which, there is a circular piece of brass, on which the globe hangs, called the *brazen meridian;* it is supported at the lowest point on a roller, on which it turns in its own plane, and passes through the horizon in two grooves cut for that purpose; on this circle the globe is supported by the extremities of its axis; and the axis passes through the brazen meridian, and carries an index round with it over a circular plate which is divided into hours, &c. On each globe there are two circles, one representing the *ecliptic*, with the characters of the signs upon it, and the other the *equator*. To each of these circles, on the celestial globe, secondaries are drawn to every 10 or 15 degrees; but on the terrestrial globe, they are drawn only to the equator. There is also a flat piece of brass, called the *quadrant of altitude*, which is occasionally fixed to the brazen meridian in its zenith, by a nut, and the lower end is put between the globe and the horizon, and can be turned round to any point; it is divided into degrees, &c. by which the altitudes of objects above the horizon may be found, and their azimuths determined. From one point of the brazen meridian corresponding to the equator, the degrees begin, and are continued both ways up to 90° at each pole; but for the other semicircle of the brazen meridian, the degrees begin at the poles, and are continued up to 90° at the equator. On the horizon, the degrees begin at the east and west points, and are continued both ways to 90°, or to the north and south points. The ecliptic and equator begin their degrees at one of their intersections, called *aries*, and they are continued round the same way to 360°; also, the former is divided into, and marked with, the twelve signs; and the latter is divided from the same point, into 24 hours. Upon the foot of the globe there is often put a compass, by which the brazen meridian may be set north and south.

ON THE USE OF THE TERRESTRIAL GLOBE.

207. *To find the Latitude of a Place.*

Bring the place under that semicircle of the brazen meridian where the divisions begin at the equator, and observe what degree the place is under, and it is the latitude required.

208. *To rectify the Globe to the Latitude of a Place.*

Elevate the pole above the horizon till its altitude, observed on the brazen meridian, be equal to the latitude of the place, and it is then said to be rectified to the latitude, and it so far stands right for the solution of all problems for that latitude.

209. *To find the Longitude of a Place from Greenwich.*

Bring the place to the graduated edge of the brazen meridian, and observe the point of the equator which lies under it, and the distance of that point from the point

where the meridian of Greenwich cuts the equator, is the longitude required.

210. *Given the Latitude and Longitude of a Place, to find where the Place is.*

Bring the given degree of longitude to the brazen meridian, and then under the given degree of latitude upon that meridian, you have the place required.

211. *When it is Noon at any Place A, to find the Hour at any other Place B.*

Bring A to the meridian, and set the index to XII; then turn the globe till B comes under the meridian, and the index will show the hour B. If it be not noon at A, set the index to the hour, and proceed as before, and you get the corresponding hour at B.

212. *To find the Distance of A from B.*

Bring A to the meridian, and screw the quadrant of altitude over it, and carry it to B, and you get the number of degrees between A and B, which multiply by 69,2, the miles in one degree, and you get the distance required.

213. *To find the Bearing of B from A.*

Rectify the globe for the latitude of A, and bring A to the meridian, and fix the quadrant of altitude to A; then direct the quadrant to B, and the point where it cuts the horizon shows the bearing required.

214. *At any Hour of the Day at B, to find the Place A, to which the Sun is vertical.*

Find the sun's place in the ecliptic, and bring it to the brazen meridian, and you find its declination on the meridian; then bring B to the meridian, and set the index to the given hour, and turn the globe till the index comes to XII at noon, and the place under the sun's declination upon the meridian, is that required.

215. *To find, at any Day and Hour, the Places where the Sun is rising, setting, or on the Meridian; also, those Places which are enlightened, and where the Twilight is beginning and ending.*

Find (by art. 214.) the place to which the sun is vertical at the given hour, and bring the same to the meridian, and rectify the globe to a latitude equal to the sun's declination. Then to all those places under the *western* semicircle of the horizon, the sun is *rising;* to those under the *eastern* semicircle, the sun is *setting;* and to those under the *meridian*, it is *noon.*

Also, all places above the horizon are enlightened, and all those below are in the dark hemisphere.

Lastly, in all those places 18° below the western horizon, the twilight is just beginning in the morning, and in those 18° below the eastern horizon is just ending in the evening.

216. *To find all the Places to which a Lunar Eclipse is visible at any Instant.*

Find the place to which the sun is vertical at any time, and bring that place to the zenith, and the eclipse will be visible to all the hemisphere *under* the horizon, because the moon is then opposite to the sun.

ON THE USE OF THE CELESTIAL GLOBE.

217. *To find the Sun's right Ascension and Declination.*

Bring the sun's place in the ecliptic to the brazen meridian, and it points out upon the meridian, the declination; and the degree of the

equator which is cut by the meridi an, is the right ascension.

218. *Given the right Ascension and Declination of an heavenly Body, to find its place.*

Bring the given degree of right ascension on the equator, to the brazen meridian, and the degree of the meridian corresponding to the declination, points out the place required.

219. *Given the Latitude of a Place, the Day and Hour, to find the Altitude and Amplitude of a given heavenly Body.*

Rectify the globe (by art. 208.) to the latitude of the place, and bring the sun's place in the ecliptic to the brazen meridian, and set the index to XII; then turn the globe till the index points to the given hour, and in that position the globe represents the proper situation of all the heavenly bodies, in respect to the meridian and horizon. Then fix the quadrant of altitude to the zenith, and direct its graduated edge to the place of the body, and it shows the altitude of the body; and the degree where it cuts the horizon, shows its amplitude. If the body be the moon or a planet, after having found its place, you may put a small patch to denote its place.

220. *Given as before, to set the Globe so that the stars upon it may correspond to their situations in the Heavens.*

The globe being fixed as in the last article, by means of the compass let the brass meridian be set in the meridian of the place, with the north pole to the north; then will all the stars upon the globe correspond to their places in the heavens, so that an eye at the centre of the globe would refer every star on its surface to the place of the star in the heavens. By comparing therefore the stars in the heavens with their places on the globe, you will easily get acquainted with the stars.

221. *To find the Time when any of the heavenly Bodies rise, set, or come to the Meridian; also, their Azimuth at rising or setting.*

Rectify the globe to the latitude of the place, and bring the sun's place in the ecliptic to the meridian, and set the index to XII, as in art. 219. Then turn the globe till the given body comes to the eastern part of the horizon, and the index shows the time of its rising; and the arc of the horizon between the body and the north or south points will give its azimuth. Bring the body to the meridian, and the index shows the time of its coming to it. Bring the body to the western horizon, and the index shows the time of its setting; and the arc of the horizon between the body and the north or south points, will give its azimuth. You may thus find the time of the sun's rising and setting. If you turn the globe about its axis, all those stars which do not descend below the horizon, never set at that place; and those which do not ascend above it, never rise.

222. *To explain, in general, the Alteration of the Lengths of the Days, and the Difference of the Seasons.*

Put patches upon the ecliptic from arles both ways to the tropics, and let them represent so many different situations of the sun; and then the globe being rectified to the latitude of the place (by art. 208.) turn it about and you will see for *north* latitude, that as the patches approach the tropic of cancer, the corresponding diurnal arcs will increase; and as the patches approach the tropic of capricorn, the diurnal arcs will decrease; also, the former arcs are greater than a semicircle, and the latter less; and the patch in the equator will describe a semicircle above the horizon. When therefore the sun is in the equator, the days and nights are equal; as he advances towards the tropic of cancer the days increase, and the

nights decrease, till he comes to the tropic, where the days are found to be longest, and the nights shortest; then as he approaches the equator, the length of the days diminishes, and that of the nights increases, and when the sun comes to the equator, the lengths of the days and nights are equal. Then as he advances towards capricorn, the days continue to diminish, and the nights increase till he comes to that tropic, where the days are shortest and the nights are longest; and then as he approaches the equator, the days increase and the nights diminish; and when he comes to the equator, the days and nights are equal. And whatever be the latitude, when the sun is in the equator, days and nights are equal. To an inhabitant at the pole, the sun will appear to be half a year above the horizon, and half a year below. To an inhabitant at the equator, the days and nights will appear to be always equal; also, all the heavenly bodies will be found to be as long above the horizon as below. At the arctic circle, the longest day will be found to be 24 hours, and the longest night 24 hours; this appears by rectifying the globe to that latitude, and observing the patches at the tropics of cancer and of capricorn. Lastly, it will be found that all places enjoy equally the sun in respect to time, and are equally deprived of it, the length of the days at one time of the year being found exactly equal to the length of the nights at the opposite season. This appears by putting patches upon the ecliptic at opposite points of it.

223. *To find the Latitude and Longitude of a given Star; also, the Distance of two Stars.*

Bring the solstitial colure to the meridian, and fix the quadrant of altitude over the pole of the ecliptic; then turn the quadrant over the given star, and the arc contained between the star and the ecliptic will be the *latitude*, and the degree on the ecliptic cut by it will be the *longitude*. The distance of two stars may be found by laying the quadrant of altitude over both, and counting the degrees between.

224. *To explain the Phenomena of the Harvest Moon.*

Rectify the globe for any northern latitude, for instance, that of *London;* and as the moon's orbit makes but a small angle with the ecliptic, let us suppose the ecliptic to represent the moon's orbit. Now, in September, when the sun is in the beginning of *libra*, if the moon be then at its full, it must be in the beginning of *aries;* and as the mean motion of the moon is about 13° in a day, put a patch on the first point of aries, and another 13° beyond it on the ecliptic; bring the former patch to the horizon, and then turn the globe till the other comes to it, and the motion of the index will show about 17′, which is the difference of times of the moon's rising on two successive nights, because the earth must make so much more than a revolution in time, before it overtakes the moon the next night. This small difference arises from the small angle which the orbit of the moon makes with the horizon. If you continue patches at every 13° till you come to *libra*, you will find the difference in the times of rising will increase up to that point, and there the difference will be about 1h. 17′; and this point of the ecliptic, when it rises, makes the greatest angle with the horizon. Hence, when the moon comes to the first point of aries, there will be the least difference of the times of her rising, and this happens at the time of the full moon, when the full moon happens about the 21st September. That point of the ecliptic which rises at the least angle with the horizon, will be found to set at the greatest, and therefore when there is the least difference in the times of rising, there will be found to be the greatest in the times of setting.

ON THE DIVISION OF TIME.

225. The revolution of the earth about the sun divides time into astronomical *years*; the revolution of the moon about the earth divides it into astronomical *months*; and the rotation of the earth about its axis divides it into astronomical *days*; these, which are also called *natural* days, include a common day and night. These natural days are subdivided by clocks into *hours*, *minutes*, and *seconds*. The first object in the regulation and division of time, is to keep the same seasons to the same months, so that the middle of summer may happen towards the end of June, and the middle of winter towards the end of December. But before the sun's motion was tolerably well known, it was not easy to accomplish this. Some of the ancients formed a *lunar* year, consisting of 12 synodic lunar months, or 354 days, at the end of which they made their year begin again. But finding that this year would not agree with the seasons, to correct it, they first added a month every 3 years; afterwards, 3 months every eighth year; and lastly, 8 months every 19 years. These were called *luni-solar* years, and were used by the *Jews* and *Romans*. The *Egyptian* year consisted of 365 days; they had 12 months of 30 days each, and then they added 5 days more. The year which NUMA introduced amongst the *Romans* was the luni-solar year, adding to the lunar year of 354 days, 22 days every two years, inserting them as an intercalary month, after February every other year. But through the ignorance or negligence of the *Priests*, who had the care of these matters, the corrections, called intercalations, necessary for preserving the agreement between the luni-solar year and the seasons, were either omitted, or so improperly applied, as to produce great disorders in the Roman calendar. Therefore, JULIUS CÆSAR, to whom, when *Pontifex Maximus*, the care of these things belonged, resolved to prevent, as far as he could, the like errors for the future. Accordingly, after having restored all the festivals to their proper seasons, he, by the assistance of SOSIGENES, an astronomer of *Alexandria* caused the old luni-solar year of NUMA to be entirely laid aside, and substituted, instead thereof, the *Egyptian* solar year of 365 days, with the correction of an additional day every four years, it having been found that the true *tropical* year, by which the seasons are governed, exceeds 365 days by six hours. This is called the *Julian* year. To add a day every fourth year, he caused the twenty-fourth day of February, which was the sixth (sextus) of the calends before March, to be reckoned twice..... Hence, this year was called *bissextile*, and it is now called *leap-year*. In our calendar, this day is added every fourth year to the end of February. This civil year immediately came into use throughout all Europe.

226. But time showed that this correction was not accurate; for it was found, that the equinoxes and solstices happened earlier by some days than they did in former distant years; and more accurate observations of the sun discovered that the true tropical year was not 365d. 6h. but 365d. 5h. 48′. 48″. The tropical year was therefore thought to be longer than it really was, by 11′. 12″, which in 129 years would amount to a whole day, and cause the equinoxes to fall sooner by one day; and therefore the middle of summer and the middle of winter would fall one day sooner. A further correction therefore became necessary.

227. Pope GREGORY XIII, therefore, set about the correction, from a desire that the moveable feast of Easter should happen as nearly as possible at the same times of the year respectively, with those at which it had been kept for some years after the general council at *Nice*, which was holden in the year 325. But this could not be corrected without affecting the civil year

in such a manner, that the vernal equinox should then, and at all future times, fall on, or as nearly as possible to, March 21, as it did at that general council, but which had then anticipated 10 days. For this purpose, he caused 10 days to be dropped in October 1582, and by this means the vernal equinox was restored to March 21. And having consulted with the astronomers, he ordered that three successive centenary years, which, according to the *Julian* account, would have been *bissextiles*, should be common years, but that every fourth centenary year should be, as it otherwise would have been, a *bissextile* year. By this means, the difference between the *civil* and *tropical* accounts for the space of 400 years will not differ so much as two hours, and will not amount to a day in less than 5082 years, at the end of which time it will be necessary to make a correction for this day. The civil year thus corrected, took place in most parts of *Europe* many years ago, but it did not take place in *England* till the year 1752, at which time a correction of 11 days was made, that being then necessary, and the *third* of September was called the *fourteenth*. This is called by us the *new stile*, and that in use before, or the *Julian* account, is called the *old stile*. As leap year happens every 4th year, and every 100th year was a leap year in the *Julian* account, therefore every year which is divisible by 4, became a leap year. Now these centenary years, which, in the *Gregorian* account are not to be leap years, are 1700, 1800, 1900, 2100, 2200, 2300, 2500, &c. Therefore as the year 1700 happened between the time of the correction by GREGORY, and that made by us, the *Gregorian* account had left out one day in that year which the *Julian* had not; therefore the *Gregorian* account, having, at the time it took place, left out 10 days, we were obliged to leave out 11 days, to bring our account to agree with that.*

228. Amongst different nations, the *beginning* of the year varied, as well as the *length*. The *Jews* began their ecclesiastical year with the new moon of that month, whose full moon happened next after the vernal equinox. The *church of Rome* begin their year on the Sunday which falls on the said full moon, or that happens next after it; or on Easter Sunday. The *Jews* began their *civil* year with the new moon which has its full moon happening next after the autumnal equinox. The *Grecians* began their year with the new moon which happened next after the summer solstice. The *Romans*, according to PLUTARCH, began their year at March, from the time of ROMULUS to NUMA, who changed the beginning to January. ROMULUS made the year consist of only ten months, as appears from the name of the last, *December*, or the tenth month; and that *March* was the first, is evident, because they called the fifth from it *quintilis*, the sixth *sextilis*, and the rest in their order. The first month of the *Egyptian* year began on our August 29. The *Arabic* and *Turkish* year began on July 16. The *ancient Clergy* made March 25, the beginning of the year.

229. The first division of the civil year is into civil *months*, of which there are twelve. These cannot be of an equal length, because the number of days in a year is not divisible by 12. There are therefore in every year, seven months of 31 days each, four of 30 days each, and in the common years one of 28 days, but which contains 29 in every leap year. These are the months used for civil purposes. But the space of 28 days is also called a month, and it is by the division of this into four equal parts, that the year is subdivided into weeks, each consisting of seven days. Hence, a common year consists of 13 of these

* As the year 1800 was a common year, there is now 12 days difference between the new and *old* stile.

months, or 52 weeks and 1 day, and a leap year of the same, and 2 days.

230. The days into which the civil year is divided, are called *natural*, and contain 24 hours. But there is a day called *artificial*, which is the time from sun-rise to sun-set. The natural day is either *astronomical* or *civil*. The astronomical day begins at noon. The *British*, *French*, *Dutch*, *Germans*, *Spaniards*, *Portuguese*, and *Egyptians*, begin the civil day at midnight; the ancient *Greeks*, *Jews*, *Bohemians*, and *Silesians*, began it at sunsetting, as do the modern *Italians* and *Chinese*; and the ancient *Babylonians*, *Persians*, *Syrians*, and modern *Greeks*, at sunrising. The *Jews*, *Chaldeans*, and *Arabians*, divide the hour into 1080 equal parts, called *scruples*.

231. The points of time from which historians begin to reckon, are called *epochs* or *eras*, and generally arise from some remarkable event. The first *era* is the *Creation of the World*. Historians differ a little in their estimation of this time, making it from 3950 to 4000 years before CHRIST. The *era* of the *Olympiads* is the most famous of the profane oness which is, placed 776 years before CHRIST, and this the *Romans* used. The *era* of *Nabonassar* was 747 years before CHRIST, from which time the *Chaldeans* and the *Egyptians* reckoned their years. The *era* we use, is called the *Christian era*, because it began at the birth of CHRIST; not indeed on the very day that he was born, which is reckoned on the 25th of December, but 7 days after, on January 1st the next year. The *era* of the *Julian* year was 45 years before this, when JULIUS CÆSAR rejected the old *Roman* year, and ordered the *Julian* year to be observed all over the Roman empire. The *Turkish era* is the *Hegira*, or *flight of Mahomet*, 622, A. C. The *Persian era* is called *Yesdegird*, 631, A. C.

232. But besides the measures of time by years, &c. it was found convenient to introduce the use of *cycles*, that is, a circulation of time between the return of the same event. The *cycle of the sun* is the space of 28 years, in which time the days of the months return again to the same days of the week, and the sun's place to the same degrees of the ecliptic on the same days, so as not to differ 1° in 100 years; and the leap years return again in respect to the days of the week on which the days of the month fall. These things arise from hence: If 365 (the days in a common year) be divided by 7, there remains 1, which shows that the last day of the year is the same as the first, that is, if the first be on the Monday, the last is on the Monday. Now it is customary to place against the seven days of the week, the first seven letters of the alphabet, A, B, C, D, E, F, G, placing A always against the first day of the year, and therefore as they were continued through the year, the same letter A must stand against the last day. Hence, if the *first* of January be a *Sunday*, and A stands against it, A points out every Sunday in the year. But as the first day of the next year is a Monday, against which A stands, G will stand against the first Sunday, and therefore against every Sunday in that year. For the same reason, the first day of the next year is Tuesday, and being marked with A, F will stand against every Sunday in the year, and so on. Therefore the *Sunday letters* will come on in an inverted order, A, G, F, E, D, C, B, in the successive years; hence, these are called *dominical* letters. This would be the case, if there were no leap year or years, of 366 days; when this happens, the additional day thus taken is marked with the same letter, which necessarily throws the Sunday letter one letter back for the rest of the year. Hence, in leap year there are two *dominical letters*, the first takes place before February 29, the second after. As therefore the regular change of the Sun-

day letter which would be completed in 7 years, is thus interrupted every four years, the whole change will be completed in 7 × 4, or 28 years. But this will be sometimes interrupted, because every three centenary years out of four, are not leap years. The year of our Saviour's birth was the 9th of this cycle; therefore to find the year of this cycle, add nine to the given year, and divide the sum by 28, and the quotient shows the number of cycles elapsed since his birth, and the remainder is the cycle for the year; if nothing remains, the cycle is 28.

233. The *cycle of the moon*, sometimes called the *Metonic cycle* from the inventor *Meton*, is a period of 19 years, in which times, the conjunctions, oppositions, and all other aspects of the moon, return on the same day of the month as they did 19 years before, but about 1½ hour sooner. The ancients formed this cycle thus: Taking any year for the cycle, they observed all the days on which the new moon happened through the year, and against each such day they placed the number 1; in the second year of the cycle they did the same, placing the number 2; and proceeded in like manner through the cycle of 19 years. This being done for one cycle, the same numbers were fitted to the calendar to show the new moons in every future cycle; and on account of their great use, they were written in *gold*, and thence called *golden numbers*. But the difference of about 1½ hour in 19 years increases to a whole day in about 312 years, so that this cycle can only hold for that time: for as the new and full moons anticipate a day in that time, the golden numbers ought to be placed one day earlier in the calendar for the next 312 years. It was thought proper, however, to make this correction at the end of whole centuries; accordingly they put the new moon forward 1 day at the end of every 300 years, for seven times successively, which makes 2100 years; and to account for the odd 12½ years, they deferred putting the moon forward to the end of 400 years, making the period of 8 × 312½=2500 years. The golden numbers were properly placed by the council of *Nice*, A. D. 325; the anticipation which has been neglected ever since, is now become almost 5 days, and therefore all the golden numbers ought now to be placed 5 days higher in the calendar for the *old stile*, than they were at the above-mentioned council; or 6 days lower for the *new stile*. But because the lunar cycle of 19 years sometimes includes 4 and sometimes 5 leap years, it is impossible to have a correct table of all the numbers, unless it be extended to 4 × 19, or 76 years. And in this case it must be adapted to the *old stile*, because in every centenary year not divisible by 4, the regular course of the leap year is interrupted by the *new stile*. The year of our Saviour's birth was the first year of the lunar cycle; hence, to find at any time the cycle for the year, add one to the given year of CHRIST, and divide the sum by 19, and the quotient is the number of cycles since the time of CHRIST, and the remainder is the cycle for the given year, or the *golden number*, and if nothing remains, 19 is the cycle.

234. The *epact* is the moon's age in days, at the beginning of the year. Let a new moon happen on January the 1st, then the epact is nothing. Now as 12 lunations are completed in 354 days, it is plain that the epact, or moon's age, would be 11 at the beginning of the second year; 22 at the beginning of the third year; and 33 at the beginning of the fourth; but as one lunation is never more than 29½ days, the epact must always be less than 30; therefore subtracting 30 from 33, there remains 3 for the epact for the fourth year. And by proceeding thus for 19 years, the epacts will stand thus: 0, 11, 22, 3, 14, 25, 6, 17, 28, 9, 20, 1, 12, 23, 4, 15, 26, 7, 18, 0; in the nineteenth year, the difference amounts to 29 days, and

therefore the month which is subtracted must consist only of 29 days, in order that the epact may begin again, as it must, the new moon falling on January 1st. These epacts being placed against the days of the months in the calendar, on which the new moons fall in each year, answer the same purpose as the golden numbers. But it is liable to be interrupted every 310 years, for the same reason, the moon having then anticipated a whole day, and therefore on the first year of the cycle, the moon would be one day old on the first of January; therefore the epact would be increased by 1, and stand thus: 1, 12, 23, 4, &c. But this arrangement would be interrupted by the omission of the leap year, every three centuries out of four; for these years being a day less than by the *Julian* account, the new moons would happen a day later, and therefore make the epact 1 less. The moon's age here supposed is the *mean* new moon, that is, the new moon that would happen, if the moon moved uniformly with its mean velocity; but as the moon's motion is variable, the *true* new moon happens at a different time, and may sometimes differ a day, that is, one may fall in one day, and the other in the next day. According to the rule therefore by which we find Easter, that festival is not always found to agree with the time deduced from the new moon, as put down in our almanacs, for there the time of the *true* new moon is put down; whereas, in the rule for finding Easter, the *mean* new moon is used. In the correction of the British calendar, we use the golden numbers, omitting the epacts; and have placed the golden numbers, not against the days of the new moon, but of the full moon, and only against the full moons in the paschal months, March and April, in order to find Easter.

235. The *indiction* is a cycle of 15 years, and was used by the Romans for indicating the times of certain payments, made by the subjects to the republic, and was established by CONSTANTINE in the year 312. Why it was confined to 15 years, or on what occasion it was instituted, are not known. If we subtract 312 from the given year, and divide the remainder by 15, what remains is the indiction for the given year; and if nothing remain, the indiction is 15.

236. The *Cycle of Easter*, called the *Dionysian Period*, is the product of the *solar* and *lunar* circles of 28 and 19 years=532 years. If the new moons did not anticipate upon this circle, as in art. 233, *Easter-day* would always be the Sunday next after the first full moon which follows March 21. But on accouut of that anticipation before the alteration of the stile, the *Ecclesiastical Easter* happened, within this century, a week different from the *true Easter*. But this is now remedied in the *Common Prayer-Book*, by making the table, which used to find *Easter forever*, of no longer use than the lunar difference will admit of.

237. The *earliest* Easter is March 22, and the *latest* is April 25; for *Easter Sunday* is always the first Sunday after the full moon, which happens upon or next after March 21st. Within these limits there are 35 days, and the number belonging to each is called the *number of direction*.

ON THE NATURE AND USE OF MAPS.

238. A map is the representation of the surface of the earth upon a plane; and these are either *general* or *particular*. A general map, is a map of the whole earth, and this is represented in two circles touching each other, representing two hemispheres of the earth, the boundaries of which are meridians. A particular map, is a map of only a part of the surface of the earth, as of one of the quarters of the world, or of any particular country. The laying down of these maps is called *projection*, of which there are several kinds.

239. In maps, three principal things are required. 1st. To show the latitude and longitude of places; and this is done by drawing a certain number of meridians, and parallels of latitude. 2d. The second requisite is, to exhibit, as nearly as you can, the shape of all the countries, for it cannot be done accurately by any projection, on account of its being made on a plane, when the earth is globular. 3d. The third is, to show the bearings of places from each other, and their distances; the former can be done in one projection, but the latter cannot.

240. The projection of maps is made according to the rules of perspective. If the eye be supposed to view the earth from an infinite distance, the appearance represented upon a plane is called an *orthographic* projection. In this case, the parts about the middle are very well represented, but the extreme parts are very much contracted. But the method generally made use of by geographers for maps, is the *stereographic*, where the eye is supposed to be on the surface of the earth, and looking at the opposite hemisphere. There is also a projection called *globular*, in which meridians, equidistant upon the surface of the earth, are represented by equidistant circles in the map. There is also another projection, used by navigators, called *Mercator's*, in which, both the meridians and parallels of latitude are represented by straight lines. These are called *sea charts*, wherein are exhibited some part of the sea, with the shores that bound it: the inlands are generally omitted, as being of no use to the sailor; but the parts near the shore are carefully laid down, with marks signifying rocks, sands, or flats, and figures expressing the *soundings*, or depths of the water. The accurate method of constructing all kinds of maps, may be seen in the Treatise of Astronomy before referred to.

241. When we are to delineate a map of a *small* part of the earth, if it be near the equator the meridians and parallels of latitude may be represented by equidistant straight lines. If at some distance from the equator, the meridians must then be made to converge a little, and the more so, the further you recede from the equator.

242. When a map is made of a *very small district*, as of a county, on whatever part of the earth it is, the meridians and parellels of latitude may be represented by equidistant parallel lines.

243. A line which cuts all the meridians at the same angle, is called a *rhumb* line; as long therefore as a ship sails upon the same rhumb, it sails upon the same point of the compass. When the projection of the meridians is by circles, then the rhumb line is a curve; but when the meridians are represented by straight and parallel lines, the rhumb becomes a straight line, it being the property of a straight line to cut parallel straight lines in the same angle.

244. Hence the great use of *Mercator's* Chart, which is constructed upon this principle. Upon the earth's surface, the degrees of latitude are all equal, but the degrees of longitude decrease as you approach the poles, as we have explained in art. 10. Now, in this projection, the meridians being equidistant straight lines, the degrees of longitude must be every where equal; in order therefore to preserve the proper proportion between the degrees of longitude and latitude, the degrees of latitude are increased in a proper proportion; the degrees of latitude therefore increase as you go from the equator to the pole. Now in sailing from one place to another, the shortest way is to sail upon a great circle, but that is a thing which is impracticable, there being nothing to direct you in such a course. Navigators therefore, when they have to go from one place A to another B, find upon what rhumb they must sail, that is, upon what point of the compass they must go, so as to come to B, and by their steering compass

they can tell when they sail on the same point. Now on *Mercator's* projection, if you draw a straight line from A to B, it gives you the rhumb required; for in these maps, there is a point assumed, and from it there are drawn 32 straight lines to the 32 points of the compass; when therefore you draw the straight line from A to B, you must observe to which of the 32 lines it is parallel, or to which it is nearest, and you thus get the rhumb, or the point of the compass you must continue to sail upon, in order to go from A to B. For instance, if you find the line AB is parallel to the south-west line of the compass, then if you continue to sail on the south-west point, you must come to B.

245. In all maps, the upper part is northern, the lower part southern, the right hand side is eastern, and the left hand side is western. On the right and left sides, the degrees of *latitude* are marked; and on the top and bottom, the degrees of *longitude* are marked. When the maps are very large, the degrees may be subdivided into halves, quarters, &c.

246. When the meridians and parallels of latitude are *straight and parallel lines*, the *latitude* of a place is found by stretching a thread over the place, so that it may cut the *same* degree of latitude on the right and left side of the map, and that degree is the latitude of the place. And to find the *longitude*, stretch a thread over the place, so that it may cut the *same* degree of longitude on the top and bottom, and that degree is the longitude of the place. For instance, if we take the chart of the East India islands, and stretch a string over *Siam*, we shall find that it will cut each side at 14° N. lat. and the top and bottom at 10°. 10′ E. long. These therefore are the latitude and longitude of that place.

247. On the contrary, if the latitude and longitude of a place be given to find the place, stretch one thread over the given degree of latitude on each side, and another thread over the given degree of longitude at the top and bottom; and at the intersection of the threads is the place required. By this means you may put down in a map, any place whose latitude and longitude are known.

248. Now let the meridians and parallels of latitude be *curve lines*. Then to find the *latitude* of a place, a parallel of latitude must be drawn through it, by the same rules as the other parallels are drawn, and it cuts the sides at the degree of latitude of the place. And to find the *longitude* of the place, draw a circle of longitude through it, by the same rules as the other circles are drawn, and it cuts the top and bottom at the degree of longitude of the place. But as it is troublesome to draw these circles, the following method may generally be sufficiently accurate. To find the *latitude*, find by a pair of compasses and a scale of equal parts, how far the place is from the two parallels between which it lies, and divide the distance of the parallels in that proportion, and you get very nearly the latitude. Suppose, for instance, the distance, between the parallels to be 5°, and that one is a parallel of 45°, and the other of 50°; and suppose the place to be within 3 parts of the parallel of 45°, and 7 parts of the parallel of 50°; then 5° must be divided into 10 parts, and 3 of those parts must be added to 45°, and it gives the latitude. This is done by proportion, thus, $3+7$, or $10 : 3 :: 5° : \frac{3\times 5°}{10} = \frac{15°}{10}$ $= 1\frac{1}{2}°$; therefore the latitude is $46\frac{1}{2}°$ nearly. In the very same manner you may find the *longitude* nearly.

249. On the contrary, if the latitude and longitude of a place be given, to find the place, draw a circle of latitude through the given latitude on each side, and a circle of longitude through the given longitude at the top and bottom, and their intersection denotes the place. Or as you know between what two parallels of latitude and of longi-

tude the place is, you know by what four lines it is bounded; and as you know the proportional distance from each line, you may easily, by trial, find the point.

250. When we undertake a voyage, we ought to be acquainted with the islands, rocks, sands, straits, rivers, &c. near which we are to sail; the windings and the runnings out of the shores, &c. we should also know the signs of being near land, which are, frequently, by the appearing of birds; the floating of weeds upon the sea; the depth and colour of the water. Moreover, we should know the times when the winds set in, particularly the trade winds or monsoons: the seasons when storms and hurricanes are to be expected, and the signs of their approach; the motions of currents; but more especially of the tides. All these things are to be learned by good sea-charts, and journals of voyages.

ON THE MARINER'S COMPASS.

251. The earth possesses a ferruginous substance which has the property of attracting iron and steel only, and this substance is called a *natural magnet*, or *loadstone*. The same property may also be communicated to iron and steel, and these are called *artificial magnets*.

252. If a piece of wire, or a needle be rendered magnetic, and be suspended upon a fine point at its middle, so that it can freely turn in an horizontal plane, one end will always be directed towards the northern part of the horizon, and the other towards the southern. The former end is called the *north pole*, and the latter end the *south pole*. These poles are not directed to the north and south poles of the earth, but vary considerably from them, and differently in different places, and this is called the *variation of the compass*; and even in the same place, they are subject to a very small gradual variation. The direction in which the magnet stands, is called the *magnetic meridian*.

253. The *mariner's compass*, or, as it is called, the *compass*, the *steering compass*, or the *needle*, consists of three parts, the box, the card or fly, and the needle. The card is a circle of stiff paper representing the horizon, with the 32 points of the compass marked upon it; the magnetic needle is fixed to the under side of this card; the centre of the needle is perforated, and a cap with a conical agate at its top is fixed in this perforation; this cap is hung on a steel pin, which is fixed to the bottom of the box, so that the card, hanging on the pin, turns freely round its centre, and the needle lies in the direction of the N. and S. points of the card, and therefore these points will always be directed to the *magnetic* north and south points of the horizon, the needle fixing itself in the *magnetic* meridian. The box which contains the card and needle, is a circular brass box, hung within another box by two concentric rings, called jimbals, so fixed by cross centres to the two boxes, that the inner one shall retain a horizontal situation in all the motions of the ship. The top of the inner box has a cover of glass, to prevent the card from being disturbed by the wind.

254. In order to determine the true point of the compass on which a ship sails it is necessary to know the *variation* of the compass at the place where you are, on which account, every means have been used to determine, by observation, what the variation is; and these observations have been put down in good sea-charts, for the use of navigators. These however can serve but for a few years, on account of their being variable at the same place; nor has it been discovered how much the variation is subject to vary. The following table from Mr. CAVALLO's Treatise on Magnetism, contains the variation at the places and times therein inserted, and upon many occasions may be found very useful.

Latitude N.	Longitude W.	Variation E.	Years.
70°. 17′	163°. 24′	30°. 21′	1779
69. 38	164. 11	31. 0	1778
66. 36	167. 55	27. 50	
65. 43	170. 34	27. 58	
63. 58	165. 48	26. 25	
59. 39	149. 8	22. 54	
58. 14	139. 19	24. 40	
55. 12	135. 0	23. 29	
53. 37	134. 53	20. 32	
50. 8	4. 40	Variation W.	
48. 44	5. 0	20. 36	1776
40. 41	11. 10	22. 38	
33. 45	14. 50	22. 27	
31. 8	15. 30	18. 7	
28. 30	17. 0	17. 43	
23. 54	18. 20	14. 0	
		15. 4	
20°. 30′	20°. 3′	14°. 35′	
19. 45	20. 39	13. 11	
16. 37	22. 50	10. 33	
15. 25	23. 36	9. 15	
13. 32	23. 45	9. 25	
12. 21	23. 54	9. 48	
11. 51	24. 5	8. 19	
8. 55	22. 50	8. 58	
6. 29	20. 5	9. 44	
4. 23	21. 2	9. 1	
3. 45	22. 34	8. 27	
2. 40	24. 10	7. 42	
1. 14	26. 2	5. 35	
0. 51	27. 10	4. 59	
0. 7	27. 0	4. 27	
Latitude S.			
1. 13	28. 58	3. 12	
2. 48	29. 57	2. 52	
3. 37	30. 14	2. 14	
4. 22	30. 29	2. 54	
5. 0	31. 40	1. 26	
6. 0	32. 50	0. 6	
		Variation E.	
6. 45	33. 30	0. 35	
		Variation W.	
7. 50	34. 20	0. 7	
8. 43	34. 20	0. 15	
		Variation E.	
9. 1	34. 50	0. 44	
		Variation W.	
10. 4	34. 49	0. 38	
		Variation E.	
12. 40	34. 49	1. 12	
13. 23	34. 49	1. 1	
14. 11	34. 49	1. 9	
15. 33	34. 40	1. 15	
16. 12	35. 20	2. 4	
18. 30	35. 50	3. 2	

Latitude S.		Longitude W.		Variation E.		Years.
20°.	8′	36°.	7′	5°.	26′	1776
21.	37	36.	9	3.	24	
24.	17	36.	8	3.	24	
26.	47	34.	27	3.	44	
28.	19	32.	20	1.	58	
30.	25	26.	28	2.	37	
				Variation W.		
33.	43	16.	30	4.	44	
35.	37	9.	30	5.	51	
38.	52	23.	20	22.	12	
		Longitude E.		Variation E.		
40.	36	173.	34	13.	47	
42.	4	167.	32	13.	17	
				Variation W.		
44.	52	155.	47	9.	28	
46.	15	144.	50	14.	48	
48.	41	69.	10	27.	39	

VARIATION OBSERVED AT LONDON AT DIFFERENT TIMES.

Years.	Variation.			Years.	Variation.		
1576	11°.	15′	East.	1717	10.	42	West.
1580	11.	11		1724	11.	45	
1612	6.	10		1725	11.	56	
1622	6.	0		1730	13.	0	
1633	4.	5		1735	14.	16	
1634	4.	5		1740	15.	40	
1657	0.	0		1745	16.	53	
1665	1.	22⅓	West.	1750	17.	54	
1666	1.	35⅓		1760	19.	12	
1672	2.	30		1765	20.	0	
1683	4.	30		1770	20.	35	
1692	6.	0		1774	21.	3	
1700	8.	0		1775	21.	30	

255. The present variation at London is about 24°, and is increasing. The change of variation is not sufficiently regular, so as to be able to ascertain at any future time, what the variation will be.

256. The magnet is subject to a *daily* variation, which is effected by heat and cold, as appears by the following observations, made by Mr. CANTON.

THE VARIATION OBSERVED AT DIFFERENT HOURS OF THE SAME DAY, JULY 27, 1759.

	Hour.	Min.	Variation W.		Thermo.
Morning	0.	18	18°.	2′	62
	6.	4	18.	58	62
	8.	30	18.	55	65
	9.	2	18.	54	67
	10.	20	18.	57	69
	11.	40	19.	4	6 8
Afternoon	0.	50	19.	9	70
	1.	38	19.	8	70
	3.	10	19.	8	68
	7.	20	18.	59	61
	9.	12	19.	6	59
	11.	40	18.	51	57½

THE MEAN VARIATION FOR EACH MONTH IN THE YEAR.

January -	7′.	8″
February -	8.	58
March -	11.	17
April -	12.	26
May -	13.	0
June -	13.	21
July -	13.	14
August -	12.	19
September	11.	43
October -	10.	36
November	8.	9
December	6.	58

By this table it appears, that the variation of the needle is greatest in summer, and least in winter.

257. Dr. HALLEY first published some variation charts, from observations made at the beginning of the present century. Another chart was afterwards formed by MOUNTAINE and DODSON, upon observations made in 1756. These charts are thus constructed. On a general map of the world, mark down with dots, all the places in which the variation is the same, and then draw a line through all these points: thus, mark down with dots, every place which has 20° east variation, and draw a line through all these dots, and you get the line of 20° east variation. Where the dots are at a considerable distance, you must fill the space up with a line which seems most to accord with the tendency of the line on each side. In Dr. HALLEY's chart, the line of no variation crosses the meridian of *London*, at about the 55° of south latitude; it then proceeds in an arched manner towards the west of the said meridian, and increasing its curvature as it advances into the northern hemisphere, terminates at *Charles Town*, in *North America*. In the *Indian* sea, the lines of variation are very irregular.

258. The method of finding by the compass, the direction in which a ship sails, is this: the compass is suspended in the cabin, and you look horizontally over the compass in the direction of the ship's wake, by which you see the point of the compass denoting the direction of the wake, the opposite point to which, is the point to which you are sailing, according to the compass; and knowing how much the compass varies, you can tell the true point of the horizon to which you are going.

259. If a magnet be suspended by an horizontal axis, so that it can freely move in a vertical plane, it will not stand in an horizontal position, although the two ends be accurately balanced, but the north end of the magnet, in this part of the world, will incline towards the horizon, or *dip*, as it is called, and of course the south pole will be ele-

vated. An instrument thus constructed is called *a dipping needle*. As you approach the southern parts of the earth, the dip will diminish, and at length the magnet will become horizontal; and proceeding more southerly, the south end will dip. The following table shows the dip at the places and times there noted. By the dip, we mean the angle which the magnet makes with the horizon.

Latitude N.		Longitude E.		North End Dips.		Years.
53°.	55′	193°.	39′	69°.	10′	1778
49.	36	233.	10	72.	29	
		Longitude W.				1776
44.	5	8.	10	71.	34	
38.	53	12.	1	70.	30	
34.	57	14.	8	66.	12	
29.	18	16.	7	62.	17	
24.	24	18.	11	59.	0	
20.	47	19.	36	56.	15	
15.	8	23.	38	51.	0	
12.	1	23.	35	48.	26	
10.	0	22.	52	44.	12	
5.	2	20.	10	37.	25	
Latitude S.						
0.	3	27.	38	30.	3	
4.	40	30.	34	22.	15	
7.	3	33.	21	17.	57	
11.	25	34.	24	9.	15	
		Longitude E.		South End Dips.		
16.	45	208.	12	29.	28	
19.	28	204.	11	41.	0	
21.	8	185.	0	39.	1	1777
35.	55	18.	20	45.	37	1774
41.	5	174.	13	63.	49	1777
45.	47	166.	18	70.	5	1773

260. In the same place, the dip is subject to a variation; it is now about 72° at London, and from the most accurate observations on the dipping needle belonging to the Royal Society, it appears to diminish about 15′ in four years. In going from north to south, the dip does not alter regularly. As it is extremely difficult to balance the needle accurately, the poles of the needle are generally reversed by a magnet, so that its two ends may dip alternately, and the mean of the two dips is taken.

261. A bar of iron which stands for some time in a vertical position, will acquire a degree of magnetism; from which, and the phenomena of the compass and dipping needle, there can be no doubt but that the cause exists in the earth. Dr. HALLEY supposed that the earth has within it a large magnetic globe (not fixed within to the external parts), having four magnetic poles, two fixed and two moveable, which will account for all the phenomena. This would make the variation subject to a constant law; whereas we find casual changes which cannot be accounted for upon this hypothesis. This the Doctor supposes may arise from an unequal and irregular distribution of the magnetic matter. The distribution also of the ferruginous matter in the shell, may cause some irregularities. The *Aurora*

Borealis has been observed to have an effect upon the needle; and it is a remarkable circumstance, that the magnetic meridian is directed to the centre of the aurora borealis. Mr. DALTON, in his *Meteorological Observations and Essays*, has deduced the following conclusions from his observations. 1st, When the aurora appears to rise only about 5°, 10°, or 15°, above the horizon, the disturbance of the needle is very little, and often insensible. 2d, When it rises up to the zenith, and passes it, there never fails to be a considerable disturbance. 3d, This disturbance consists in an irregular oscillation of the horizontal needle, to the eastward and westward of the mean daily position; and in this place *(Kendal)* the excursions on each side are about half a degree. 4th, When the aurora ceases, or soon after, the needle returns to its former station. It appears from hence, that there is something magnetic in the higher parts of the atmosphere.

262. Mr. DALTON has also given us the following observations respecting the effects which the aurora borealis has on the weather. Since the Spring of 1787, there have been 227 *auroræ* observed at *Kendal* and *Keswick*; 88 of the next succeeding days were *wet*, and 139 *fair*, at *Kendal*; now in the account of rain, the mean yearly number of *wet* days is 217, and of *fair* days 148; hence, the chances of any one day, taken at random, being wet or fair, are as those numbers. But it appears that the proportion of fair days to wet ones succeeding the auroræ, is much greater than this general ratio of fair days to wet ones; the inference therefore is, that the appearance of the aurora borealis is a prognostication of *fair* weather.

263. It may perhaps be here objected, that as the aurora can only be seen in a clear atmosphere, this circumstance alone would render it probable that the next day would be fair; but upon examining the observations, it appears that the aurora not only favours the next day, but it also indicates that a series of days to the number of ten or twelve are likely to be fair.

Of 227 observations, 139 were followed by one or more fair days, 100 by 2 or more, &c. as under:

1	2	3	4	5	6	7	8
139	100	69	52	38	30	21	16

9	10	11	12
10	6	2	1

But according to the laws of chance, the series ought to have been, if the aurora had no influence, as under:

1	2	3	4	5	6
92	38	15	6	2	1

From which it appears, that there should not have been above 1 aurora out of 227 followed by 6 *fair* days, and yet, in fact, there were 30..... The aurora is more frequently followed by fair weather in summer than in winter.

ON WINDS.

264. Wind is a current of air, and its direction is denominated from that point of the compass *from* which it comes. The principal, if not the only cause of winds, is a partial rarefaction of the air by heat. When the air is heated, it becomes rarer, and therefore ascends; and the surrounding cold air rushing in to supply its place, forms a current in some one direction. Winds may be divided into *constant*, or those which blow always in the same direction; *periodical*, or those which blow half a year in one direction, and half a year in a contrary direction; these are called *monsoons*; and *variable*, which are subject to no rules. The two former are also called *trade winds*. We shall here give the principal phenomena of the winds, from Dr. HALLEY's account thereof in the *Phil. Trans.*

1st, In the Atlantic and Pacific Ocean, under the equator there is a constant east wind.

2d, To about 28° on each side of the equator, the wind on the *north* side declines towards the *north east*,

and the more so, the further you recede from the equator; and on the *south* side it declines in like manner towards the *south-east*. The limits of these winds are greater in the Atlantic Ocean, on the American, than on the African side, extending in the former case to about 32°, and in the latter to about 28°. And this is true likewise to the southward of the equinoctial; for near the *Cape of Good Hope*, the limits of the trade winds are 3° or 4° nearer the line than on the coast of *Brasil*.

3d, Towards the *Caribbee Islands*, the aforesaid north-east wind becomes more easterly, so as sometimes to be east, and sometimes east by south, but most northwards of the east, a point or two.

4th, On the coast of Africa, from the *Canaries* to about 10° north latitude, the wind sets in towards the north-east; then it becomes south-west, approaching more to the south, as you approach the *Cape*. But away from the coasts, the winds are perpetually between the south and the east; on the African side they are more southerly; on the Brasilian more easterly, so as to become almost due east. Upon the coast of *Guinea*, they are subject to frequent calms, and violent sudden gusts, called *tornados*, from all points of the compass.

5th, In the *Indian* Ocean, the winds are partly *constant*, and partly *periodical*. Between *Madagascar* and *New-Holland*, from 10° to 30° latitude, the wind blows south-east by east. During the months of *May*, *June*, *July*, *August*, *September*, *October*, the aforesaid south-east winds extend to within 2° of the equator; then for the other 6 months, the contrary winds set in, and blow from 5° to 10° south latitude. From 3° south latitude over the *Arabian* and *Indian* seas and *Bay of Bengal*, from *Sumatra* to the coast of *Africa*, there is another *monsoon*, blowing from *October* to *April* on the north-east point, and in the other half year from the opposite direction. Between Madagascar and Africa, a south-west wind blows from *April* to *October*, which, as you go more northerly, becomes more westerly, till it falls in with the west-south-west winds; but the Doctor could not obtain a satisfactory account, how the winds are in the other half year. To the eastward of *Sumatra* of *Malacca*, on the north side of the equator along the coast of *Cambodia* and *China*, the *monsoons* blow, and change at the same time as before mentioned; but their directions are more northerly and southerly. These winds reach to the *Philippine Islands* and to *Japan*. Between the same meridians, on the south side of the equator, from *Sumatra* to *New-Guinea*, the same monsoons are observed. The shifting of these winds is attended with great hurricanes.

265. The east wind about the equator is thus explained. The sun moving from east to west, the point of greatest rarefaction of the air, by the heat of the sun, must move in the same direction; and the point of greatest rarefaction following the sun, the air must continually rush in from the east, and make a constant east wind.

266. The constant north-east wind on the north side of the equator, and south-east wind on the south side, may be thus accounted for. The air towards the poles being denser than that at the equator, will continually rush towards the equator; but as the velocity of different parts of the earth's surface from its rotation, increases as you approach the equator, the air which is rushing from the north towards the equator will not continue upon the same meridian, but it will be left behind; that is, in respect to the earth's surface, it will have a motion from the east, and these two motions combined, produce a north-east wind on the north side of the equator. And in like manner there must be a south-east wind on the south side. The air which is thus continually moving from the poles towards the equator, being rarefied when it comes there, ascends to the

top of the atmosphere, and then returns back to the poles. This solution is given by Mr. HADLEY in the *Phil. Trans.* vol. 39.

267. The periodical winds are supposed to be owing to the course of the sun northward and southward of the equator. Dr. HALLEY explains them thus: "seeing that so great Continents do interpose and break the continuity of the Ocean, regard must be had to the nature of the soil, and the position of the high mountains, which I suppose the two principal causes of the several variations of the winds from the general rule: for if a country lying near the sun, prove to be flat, sandy, low land, such as the Deserts of Libya are usually reported to be, the heat occasioned by the reflection of the sun's beams, and the retention thereof in the sand, is incredible to those that have never felt it; whereby the air being exceedingly rarefied, it is necessary that the cooler and more dense air should run thitherward to restore the equilibrium. This I take to be the cause, why near the coast of Guinea, the wind always sets in upon the land, blowing westerly instead of easterly, there being sufficient reason to believe, that the inland parts of Africa are prodigiously hot, since the northern borders thereof were so intemperate, as to give the ancients cause to conclude, that all beyond the tropic was made uninhabitable by excess of heat. From the same cause it happens, that there are so constant calms in that part of the Ocean called the *Rains*. For this tract being placed in the middle, between the westerly winds blowing on the coast of Guinea, and the easterly trade winds blowing to the westward thereof, the tendency of the air here is indifferent to either, and so stands in equilibrio between both; and the weight of the incumbent atmosphere being diminished by the continual contrary winds blowing from hence, is the reason that the air here holds not the copious vapours which it receives, but lets them fall in so frequent rains.

268. As the cold and dense air, by reason of its greater gravity, presses upon the hot and rarefied, it is demonstrative that this latter must ascend in a continual stream as fast as it is rarefied, and that being ascended, it must disperse itself to preserve the equilibrium, that is, by a contrary current, the upper air must move from those parts where the greatest heat is: so by a kind of circulation, the north-east trade wind below, will be attended with a south-west above, and the south-east below, with a north-west wind above. And that this is more than a bare conjecture, the almost instantaneous change of the wind to the opposite point, which is frequently found in passing the limits of the trade winds, seems to assure us; but that which above all confirms this hypothesis, is this, that the phenomenon of the monsoons is, by this means, most easily solved, and without it, hardly explicable. Supposing therefore such a circulation as above, it is to be considered, that to the northward of the *Indian Ocean* there is everywhere land within the usual limits of the latitude of 30°, viz. *Arabia*, *Persia*, *India*, &c. which for the same reason as the Mediterranean parts of *Africa*, are subject to unsufferable heats when the sun is to the north passing nearly vertical, but yet are temperate enough when the sun is removed towards the other tropic, because of a ridge of mountains at some distance within the land, said to be frequently in winter covered with snow, over which the air, as it passes, must needs be much chilled. Hence it comes to pass, that the air coming, according to the general rule, out of the north-east in the Indian Seas, is sometimes hotter, sometimes colder than that which, by this circulation, is returned out of south-west, as is clear from the times wherein these winds set in, viz. in April, when the sun begins to warm those countries to the north, the south-west monsoon begins, and blows during the heats till October, when the sun being retired,

and all things growing colder northward, and the heat increasing to the south, the north-east winds enter and blow all the winter till April again.

269. And it is undoubtedly from the same principle, that to the southward of the equator, in part of the *Indian Ocean*, the north-west winds succeed the south-east, when the sun draws near the tropic of *Capricorn*. But I must confess, that in this latter occurs a difficulty not well to be accounted for, which is, why this change of the monsoons should be any more in this Ocean, than in the same latitudes in the *Ethiopic*, where there is nothing more certain than a south-east wind all the year.

270. It is likewise very hard to conceive, why the limits of the trade winds should be fixed about the 30° of latitude all round the globe, and that they should so seldom transgress or fall short of those bounds; as also, that in the *Indian* Sea, only the northern part should be subject to the changeable monsoons, and in the southern there should be a constant south-east."

271. There may perhaps be some causes of these periodical winds, which we cannot see altogether a solution of; but if all the circumstances of situation, heat, cold, &c. were known, there is no reason to doubt but that they might be accounted for from the principles here delivered.

272. Winds over the same place, at different altitudes, are found to blow in different directions; for we see clouds at different altitudes moving in different directions; and experiments with air balloons prove the same.

273. We may further observe in respect to the direction in which winds blow, that if a current set off in any one direction, north-east for instance, and move in a great circle, it will not continue to move on that point of the compass, because a great circle will not meet all the meridians at the same angle. This circumstance therefore should enter into our consideration, in estimating the direction of the wind. High mountains are also observed to change its direction. On the lake of *Geneva* there are only two winds, that is, either up or down the valley. And the like is known to happen at other such places.

274. The *constant* and *periodical* winds blow only at sea; at land, the wind is always *variable*.

275. Besides the winds already mentioned, there are others called *land* and *sea breezes*. The air over the land being hotter during the day than the air over the sea, a current of air will set in from the sea to the land by day; but the air over the sea being hotter than that over the land at night, the current at night will be from the land to the sea. This is very remarkable in islands situated between the tropics. Mr. CLARE exemplifies this, by the following experiment; In the middle of a vessel of water, place a water-plate of warm water, the water in the vessel representing the ocean, and the plate, the island rarefying the air over it. Then hold a lighted candle over the cold water, and blow it out, and the smoke will move towards the plate. But if the plate be cold, and the surrounding fluid warm, the smoke will move in the contrary direction. The sea breezes in the West Indies begin to appear about 9 in the morning, in a fine black curl upon the water, approaching the shore; it increases gradually till noon, and dies away at 4 or 5 in the afternoon. About 6 in the evening it changes to a land breeze, which blows from the land to the sea, and lasts till 8 in the morning.

276. Dr. DERHAM, from repeated observations upon the motion of light downy feathers, found that the greatest velocity of the wind was not above 60 miles in an hour. But Mr. BRICE justly observes, that such experiments must be subject to great inaccuracy, as the feathers cannot proceed in a straight line; he therefore estimates the velocity by means of the shadow of a cloud over the earth, by which he

found, that in a great storm, the wind moves 63 miles in an hour; when it blows a fresh gale, at the rate of 21 miles in an hour; and in a small breeze, at the rate of about 10 miles in an hour: but this method takes for granted that the clouds move as fast as the wind. It is probable that the velocity is something more than is here stated. Mr. ROUSE makes the velocity of a hurricane which tears up trees, &c. to be 100 miles in an hour.

277. There are certain lakes which, at times, are agitated during a calm season, by some unknown cause; and the phenomenon is called a *bottom wind*. Mr. DALTON, in his *Meteorological Observations*, informs us, that Mr. CROSTHWAITE has been pretty assiduous in procuring intelligence respecting these phenomena, and in observing any circumstances which might lead to a discovery of the cause; but nothing has yet occurred to him, that promises to throw any light upon the subject.

OBSERVATIONS MADE ON DERWENT LAKE.

1789.

April 30. From 8 A. M. till noon, the lake pretty much agitated.

August 9. At 8 A. M. the lake in very great agitation; white breakers on large waves, &c. without wind.

August 29. At 9 A. M. a small bottom wind.

1790.

June 20. At 8 P. M. a bottom wind on the lake.

October 11. At 8 P. M. a bottom wind on the lake.

December 1. At 9 P. M. a strong bottom wind on the lake.

1792.

October 28. At 1 P. M. a bottom wind; the water much agitated.

278. In many parts of the world, more particularly in the *West Indies*, they are attacked by hurricanes; these happen there in the rainy season, principally in the month of August; destroying all the produce of the ground; tearing up trees; blowing down buildings; and inundating large tracts of the country. They are sudden and very violent storms of wind, rain, thunder and lightning, attended with a great swelling of the sea, and sometimes with earthquakes. There are signs by which the inhabitants are warned of their approach. They come on either at the quarter, or at the full change of the moon. If they come on at the full change, then at the preceding change, the sky is troubled, the sun more red than usual, there is a dead calm below, and the tops of the mountains are free from those mists which usually hover about them. In the caverns of the earth, and in wells, you hear a hollow rumbling sound, like the rushing of a great wind. At night, the stars seem much larger than usual, and are surrounded with a sort of burs; the north-west sky has a black and menacing appearance; the sea emits a strong smell, and rises into vast waves, often without any wind. The wind itself now forsakes its usual eastern steady stream, and shifts about to the west, from whence it sometimes, with intermissions, blows violently and irregularly for about 2 hours at a time.

279. The quality of air depends in a great measure upon the soil over which it passes. The sandy deserts of *Africa* and *Arabia*, give a burning heat and blasting quality to the air passing over them. At *Goree*, in the river *Senegal*, there is an easterly wind from the inland parts, with which those who are suddenly met by it in the face are scorched, as by a blast from a furnace. At *Falkland Islands* an extraordinary blasting wind is felt, but its duration is seldom above 24 hours. It cuts down the herbage, as if fires had been made under them; the leaves are parched up and crumbled into dust; fowls are seized with cramps, and never recover; men are oppressed with a

stopped perspiration, heaviness at the breast, and sore throat, but they recover with proper care. But the most dreadful winds are those at the deserts near *Bagdad*, called the *samiel*, or *mortifying wind*. The camels perceive their approach, and are said to make an unusual noise, and cover their noses in the sand. To escape their effects, travellers throw themselves as close as possible on the ground, and wait till it has passed over, which is commonly in a few minutes. Thus some escape; but those who die, have their limbs mortified. If this wind meet with a shower of rain, it is said to be deprived of its noxious quality. It is also said, that it never passes the walls of the city. In *Italy* there is a wind called by the *Italians*, *Sirocco*. It blows for several days, and its mean heat is about 112° of *Fahrenheit's* thermometer. It is fatal to vegetation, and destructive to the inhabitants; depressing their spirits, and suspending the powers of digestion; so that they who venture to eat a heavy supper whilst these winds prevail, are frequently found dead the next morning. It is felt with peculiar violence at *Palermo*, where the inhabitants shut their doors and windows; and where there are no shutters, they hang up wet blankets, and servants are employed to keep them wet. No body ventures out, if he can possibly avoid it.

280. Mr. BRUCE, in relating the particulars of his journey across the *deserts of Africa*, mentions prodigious pillars of sand, moving with great velocities. Eleven of them appeared at once, at the distance of about three miles from him; the greatest diameter of the largest was estimated at ten feet. The same phenomenon appeared again within a few days after; more pillars in number, but less in size. They began immediately after sun rise, and his rays shining through them, gave them the appearance of pillars of fire.

281. There is a phenomenon called a *water spout*, hanging under a deep cloud, in the form of a cone with the vortex downwards; and under it the sea boils up, and rises in a conical form; these two cones sometimes meet, and they generally begin to appear together; but sometimes the boiling of the sea appears first. The position of the cones is mostly perpendicularly to the sea, but sometimes it is oblique; and sometimes the spout is in the form of a curve. They frequently disappear suddenly, and sometimes they move for a considerable space before they break. The form of the water spout is more properly that of a speaking trumpet, the smaller end being downwards. Sometimes these water spouts appear at land. When they appear at sea, and are approaching a ship, it is said that the sailors fire at them and break them; as it might be dangerous if they were to meet with a ship and break over it. It is with good reason supposed that this is an electrical phenomenon; for they generally appear in months which are subject to thunder storms, and are commonly preceded, accompanied, or followed by lightning, rain, or hail. Flashes of light have been seen about them. But the most remarkable circumstance is, that they have been dispersed by presenting to them sharp pointed knives or swords. The analogy also between a water spout and electricity may be shown, by hanging a drop of water on the under side of a plate of brass connected with the prime conductor, and placing a vessel of water under, at a small distance; then upon working the machine, the water will descend from the drop in a conical form, and the water in the vessel will rise up under it in the form of a cone; resembling very accurately the water spout, and the ascent of the water in the sea under. If we therefore suppose the cloud to be strongly charged with the electric matter, we have cause sufficient to solve the phenomenon. This theory of water spouts is confirmed by one which Mr. FORSTER gives an

account of in his voyage round the world. On the coast of *New Zealand*, he saw the water in a space of 50 or 60 furlongs, move towards its centre, and there rising into vapour, by the force of the whirling motion which it had, ascended in a spiral form towards the clouds; directly over which the cloud descended in a gradually tapered long slender tube, which soon united with the ascending spiral in a cylindrical form. The water was whirled upwards with great violence in a spiral, and appeared to leave a hollow space in the middle; so that it seemed to form a hollow tube; and this was rendered probable, as it looked exactly like a hollow glass tube. After some time, the column became incurvated, and then broke, with the appearance of a flash of lightning.

282. *A whirlwind* is a wind which rises suddenly; is extremely rapid and impetuous, taking up all light substance from the earth which it may meet with, and carrying them up in a spiral motion. Dr. FRANKLIN supposes that a whirlwind and a water spout proceed from the same cause; and this opinion is strengthened by the following circumstances. They have each a progressive and circular motion; they usually rise after calms and great heats, and most frequently happen in warm latitudes; the wind blows every way both to the whirlwind and water spout; and a water spout has moved from the sea to the land and produced all the effects of a whirlwind. They are both of them probably therefore the effects of the electrical fluid.

ON THE BAROMETER.

283. The *Barometer* is an instrument to measure the weight or pressure of the atmosphere, and is so well known, that it is unnecessary here to describe it. Suffice it to say, that the air in the glass tube is supported by the pressure of the air upon the mercury in the bason, in which the lower and open end of the tube is immersed; and the space in the tube above the mercury is a vacuum. When therefore the pressure of the air is increased, the mercury must rise in the tube; and when the pressure is diminished, the mercury must fall. Upon the level of the surface of the earth, the limits of the height of the mercury in the tube above the surface of the mercury in the bason, is from 28 to 31 inches; a graduated scale is therefore placed against the tube from 28 to 31 inches, in order to ascertain the height of the mercury in the tube. But those barometers which are made to measure the heights of mountains, are graduated much lower; because, as you ascend in the atmosphere, the mercury falls. When the mercury stands at the altitude of 30 inches, the pressure of the air upon every square inch of the earth's surface is about 15lb. avoirdupoise. At any other altitude of the mercury, the pressure will be in proportion to the altitude. Hence, if we take the surface of a middle-sized man to be 14½ square feet, when the air is lightest, its pressure on him is 13,2 tons, and when heaviest it is 14,3 tons; the difference of which is 2464lb. This difference of pressures must greatly affect us in respect to our animal functions, and therefore in respect to our health; more especially when the change is sudden. The pressure of the air upon the whole surface of the earth, is about 7767029797356342 9 tons.

DR. HALLEY'S ACCOUNT OF THE RISING AND FALLING OF THE MERCURY IN A BAROMETER, UPON THE CHANGE OF WEATHER.

284. To account for the different heights of the mercury at several times, it will be necessary to enumerate some of the principal observations made upon the barometer.

1st, In calm weather, when the air is inclined to rain, the mercury is commonly low.

2dly, In serene, good, settled weather, the mercury is generally high.

3dly, Upon very great winds, though they be not accompanied with rain, the mercury sinks lowest of all, with relation to the point of the compass the wind blows upon.

4thly, The greatest heights of the mercury, *cæteris paribus*, are found upon easterly and north-easterly winds.

5thly, In calm frosty weather, the mercury generally stands high.

6thly, After very great storms of wind, when the quicksilver has been low, it generally rises again very fast.

7thly, The more northerly places have greater alterations of the barometer than the more southerly.

8thly, Within the tropics, and near them, those accounts we have had from others, and my own observations at *St. Helena*, make very little or no variation of the height of the mercury in all weathers.

285. Hence I conceive, that the principal cause of the rise and fall of the mercury, is from the variable winds which are found in the temperate zones, and whose great inconstancy here in England is most notorious.

286. A second cause is the uncertain exhalation and precipitation of the vapours lodging in the air, whereby it comes to be at one time more crowded than another, and consequently heavier; but this latter in a great measure depends upon the former. Now from these principles I shall endeavour to explicate the several phenomena of the barometer, taking them in the same order I laid them down.

1st, The mercury being low inclines it to rain, because the air being light, the vapours are no longer supported thereby, being become specifically heavier than the medium wherein they floated; so that they descend towards the earth, and in the fall meeting with other aqueous particles, they incorporate together and form little drops of rain. But the mercury's being at one time lower than at another, is the effect of two contrary winds blowing *from* the place where the barometer stands, whereby the air of that place is carried both ways from it, and consequently the incumbent cylinder of air is diminished, and accordingly the mercury sinks. As for instance, if in the *German Ocean* it should blow a gale of westerly wind, and at the same time an easterly wind in the Irish Sea; or if in *France* it should blow a northerly wind, and in *Scotland* a southerly, it must be granted me that, that part of the atmosphere impendant over *England* would thereby be exhausted and attenuated, and the mercury would subside, and the vapours which before floated in those parts of the air of equal gravity with themselves, would sink to the earth.

2dly, The great height of the barometer is occasioned by two contrary winds blowing *towards* the place of observation, whereby the air of other places is brought thither and accumulated; so that the incumbent cylinder of air being increased both in height and weight, the mercury pressed thereby must needs rise and stand high, as long as the winds continue so to blow; and then the air being specifically heavier, the vapours are better suspended, so that they have no inclination to precipitate and fall down in drops; which is the reason of the serene good weather, which attends the greater heights of the mercury.

3dly, The mercury sinks the lowest of all by the very rapid motion of the air in storms of wind. For the tract, or region of the earth's surface, wherein these winds rage, not extending all round the globe, that stagnant air which is left behind, as likewise that on the sides, cannot come in so fast as to supply the evacuation made by so

swift a current; so that the air must necessarily be attenuated when and where the said winds continue to blow, and that more or less according to their violence; add to which, that the horizontal motion of the air being so quick as it is, may in all probability take off some part of the perpendicular pressure thereof: and the great agitation of its particles is the reason why the vapours are dissipated and do not condense into drops so as to form rain, otherwise the natural consequence of the air's rarefaction.

4thly, The mercury stands the highest upon an easterly or north-easterly wind, because in the great *Atlantic Ocean*, on this side the 35th degree of north latitude, the westerly and south-westerly winds blow almost always trade, so that whenever here the wind comes up at east and north-east, it is sure to be checked by a contrary gale as soon as it reaches the ocean; wherefore according to what is made out in our second remark, the air must needs be heaped over this island, and consequently the mercury must stand high, as often as these winds blow. This holds true in this country, but it is not a general rule for others where the winds are under different circumstances; and I have sometimes seen the mercury here as low as 29 inches, upon an easterly wind; but then it blew exceeding hard, and so comes to be accounted for by what was observed upon the third remark.

5thly, In calm frosty weather the mercury generally stands high, because (as I conceive) it seldom freezes but when the wind comes out of the northern and north-eastern quarters, or at least unless these winds blow at no great distance off; for the northern parts of *Germany*, *Denmark*, *Sweden*, *Norway*, and all that tract from whence north-eastern winds come, are subject to almost continual frost all the winter; and thereby the lower air is very much condensed, and in that state is brought hitherwards by those winds, and being accumulated by the opposition of the westerly wind blowing in the Ocean, the mercury must needs be pressed to a more than ordinary height; and as a concurring cause, the shrinking of the lower parts of the air into lesser room by cold, must needs cause a descent of the upper parts of the atmosphere to reduce the cavity made by this contraction to an equilibrium.

6thly, After great storms of wind, when the mercury has been very low, it generally rises again very fast. I once observed it to rise 1¼ inch in less than 6 hours, after a long continued storm of south-west wind. The reason is, because the air being very much rarefied, by the great evacuations which such continued storms make thereof, the neighbouring air runs in more swiftly to bring it to an equilibrium; as we see water runs the faster for having a great declivity.

7thly, The variations are greater in the more northerly places, as at *Stockholm* greater than at *Paris* (compared by Mr. PASCHALL), because the more northerly places have usually greater storms of wind than the more southerly, whereby the mercury should sink lower in that extreme; and then the northerly winds bringing the condensed and ponderous air from the neighbourhood of the pole, and that again being checked by a southerly wind at no great distance, and so heaped, must of necessity make the mercury in such case stand higher in the other extreme.

8thly, Lastly, this remark, that there is little or no variation near the equinoctial, as at *Barbadoes* and *St. Helena*, does above all things confirm the hypothesis of the variable winds being the cause of these variations of the height of the mercury; for in the places above-named, there is always an easy gale of wind blowing nearly upon the same point, viz. E. N. E. at *Barbadoes*, and E. S. E. at *St. Helena*, so that there being no contrary currents of the air to exhaust or accumulate it, the

atmosphere continues much in the same state: however, upon hurricanes (the most violent of storms) the mercury has been observed very low, but this is but once in two or three years, and it soon recovers its settled state of about 29½ inches.

287. The principal objection against this doctrine is, that I suppose the air sometimes to move *from* those parts where it is already evacuated below the equilibrium, and sometimes again *towards* those parts where it is condensed and crowded above the mean state, which may be thought contrary to the laws of Statics, and the rules of the equilibrium of fluids. But those who shall consider how when once an impetus is given to a fluid body, it is capable of mounting above its level, and checking others that have a contrary tendency to descend by their own gravity, will no longer regard this a material obstacle; but will rather conclude, that the great analogy there is between the rising and falling of the water upon the flux and reflux of the sea, and this of accumulating and extenuating the air, is a great argument for the truth of the hypothesis. For as the sea, over against the coast of *Essex*, rises and swells by the meeting of the two contrary tides of flood, whereof the one comes from the S. W. along the channel of England, and the other from the north; and on the contrary, sinks below the level upon the retreat of the waters both ways, in the tide of ebb; so it is very probable, that the air may ebb and flow after the same manner; but by reason of the diversity of causes whereby the air may be set in moving, the times of these fluxes and refluxes thereof are purely casual, and not reducible to any rule, as are the motions of the sea, depending wholly upon the regular course of the moon. Thus far Dr. HALLEY.

288. The following rules are given for judging of the weather by Mr. PATRICK, and are esteemed the best which we have.

1. The rising of the mercury presages, in general, fair weather; and its falling, foul weather; as rain, snow, high winds, and storms.

2. In very hot weather, the falling of the mercury indicates thunder.

3. In winter, the rising indicates frost: and in frosty weather, if the mercury fall 3 or 4 divisions, there will follow a thaw. But in a continued frost, if the mercury rise, it will snow.

4. When foul weather happens soon after the falling of the mercury, expect but little of it; and on the contrary, expect but little fair weather, when it proves fair shortly after the mercury has risen.

5. In foul weather when the mercury rises much and high, and so continues for two or three days before the foul weather is quite over, then expect a continuance of fair weather to follow.

6. In fair weather when the mercury falls much and low, and thus continues for 2 or 3 days before the rain comes, then expect a great deal of wet, and probably high winds.

7. The unsettled motion of the mercury, denotes uncertain and changeable weather.

8. You are not so strictly to observe the words on the plate, though in general the weather agrees with them: For if the mercury stand at *much rain* and then rise to *changeable*, it denotes fair weather, though not to continue so long as if the mercury had risen higher. And on the contrary, if the mercury stand at *fair* and fall to *changeable*, it denotes foul weather, though not so much as if it had sunk lower.

289. The following rules are useful to judge when the mercury is rising or falling.

1. If the surface of the mercury be convex, it is rising.

2. If the surface of the mercury be concave, it is falling.

3. If the *middle* of the mercury be plain, it is neither rising nor falling; for mercury put into a glass

tube) will naturally have the parts adjacent to the tube convex.

4. As the mercury will adhere a little to the tube, before you note its height, it is proper to shake the barometer a little, by giving it a little tap with the knuckle.

ON THE THERMOMETER.

290. A *Thermometer* is an instrument to measure different degrees of heat. It is a small glass tube with a bulb at the bottom, having the bulb and part of the tube filled with mercury, or spirits of wine. The tube is closed at the top, and the part not occupied by the fluid is a vacuum. Against the tube there is a scale to measure the expansion of the fluid under different temperatures; for fluids expand by heat, and contract by cold. An increase of temperature will therefore make the fluid rise in the tube, and a decrease of temperature will make it fall.

291. The thermometer now in use is that which is constructed by FAHRENHEIT. On this scale, the fluid stands at 32 when it just begins to freeze, and at 212 when put into boiling water; at temperate it stands at 55; at summer heat, at 76; at blood heat, at 98. If the scale be continued to 600, it gives the heat of boiling mercury; and if it be continued downwards to 39 below 0, it gives a degree of cold which will freeze mercury.

292. By means of the barometer and thermometer, the altitude of a mountain may be found to a great degree of accuracy. The following is the rule given by Dr. MASKELYNE in his introduction to TAYLOR'S Logarithms; being the mean between those given by General ROY and Sir GEORGE SHUCKBURGH.

293. Given the altitudes of the barometer at two stations, with the heights of Fahrenheit's thermometer *attached* to the barometer, and the heights of two *detached* thermometers of the same kind, exposed to the air but sheltered from the sun at the two stations, to find the perpendicular altitude of one station above the other.

RULE. Put H for the observed height of the barometer at the lower station, and h for that at the upper station, D for the difference of heights of FAHRENHEIT'S thermometer *attached* to the barometer at the two stations, and m for the mean of the two heights of the two *detached* thermometers exposed freely for a few minutes to the open air in the shade, at the two stations; then the altitude of the upper station above the lower, in English fathoms, is thus expressed:

$$(\text{Log. } H - \text{log. } h \mp 0{,}454\, D) \times (1 + \overline{m - 32^\circ} \times 0{,}00244.)$$

Where the upper sign — is to be used, when the thermometer *attached* to the barometer is highest at the lower station (which is most usual), and the lower sign +, when it is lowest at the lower station.

But to render the rule more generally useful, we shall put it down in common language.

RULE. Take the difference of the common logarithms of the observed heights of the barometers at the two stations, considering the first four figures, exclusive of the index, as whole numbers, and the remaining figures to the right as decimals, and *subtract* or *add* 0,454 multiplied by the difference of altitudes of FAHRENHEIT'S thermometer *attached* to the barometer at the two stations, according as it was highest at the *lower* or *upper* station; and this is nearly the required height. Then multiply the height thus nearly found, by the difference between the mean of the two altitudes of the two *detached* thermometers exposed to the air at the two stations, and 32°, and again that product by 0,00244, and the last product will be the correction of the altitude before nearly found; which

added to or *subtracted* from the same, according as the mean of the two altitudes of the *detached* thermometers exposed to the air, was *higher* or *lower* than 32°, will give the true height of the upper station above the lower, in English fathoms; and this multiplied by 6, gives the true altitude in English feet.

Ex. Let the state of the barometers and thermometers be as follows; to find the altitude of one station above the other.

Barometers.	Thermometers.	
	attached.	*detached.*
Lower 30,16	59	58
Upper 24,19	47	42
	12dif.	50 mean

	Log.
30,16 - - -	14794,313
24,19 - - -	13836,359
	957,954
Subtract - -	5,448=0,454×12
Altitude nearly - -	952,506
	18=50—32
	7620048
	952506
	17145,108
	0,00244
	68580432
	68580432
	34290216
Cor. add - - -	41,83406962
Alt. nearly - -	952,506
True Alt. in - - -	994,340 fathoms
	6
	5966,04 feet

For heights which do not exceed 4000 or 5000 feet, Sir G. SHUCKBURGH gives the following rule:

Let A=the mean height of the two barometers in inches; a=the difference of the two in tenths of an inch; b=the number of feet in the table, corresponding to the *mean* height of the two thermometers; x=the height of the mountain in feet; then $x=\frac{30ab}{A}$

Ther.	Feet.
32°	86,85
35	87,49
40	88,54
45	89,60
50	90,66
55	91,72
60	92,77
65	93,82
70	94,88
75	95,93
80	96,99

Ex. Suppose the barometer at the bottom to be 29,72 inches, thermometer 64°; the barometer at the top to be 27,46, thermometer 58°; to find the altitude of the mountain.

Here A=28,59 inches; a=22,6; the mean heat of the two thermometers =61, the proportional number corresponding to which found from the table is 92,98=b, hence $x=\frac{30\times22,6\times92,98}{28,59}=2205$ feet the height required.

294. The mean height of the barometer in London, from observations made at the Royal Society, is 29,88 inches; and the mean temperature, according to FAHRENHEIT's thermometer, is 58°. The mean height at the surface of the sea is 30,04 inches, the heat of the barometer being 55°, and that of the air 62°, according to Sir GEORGE SHUCKBURGH.

295. The heights of some of the most remarkable mountains in English feet.

	Feet
Snowden	3555
Moel Eilio	2371
Schihallien, west summit of	3281
Kirk Yetton Cairn	1544
Skiddaw	3240
Helvellyn	3300
Monte Rosa	15084
Montblanc	14432
Argentiere	12172
Buet	8894
Mole	4883
Dole	4293
Saleor	3284
Mont Cenis, at the Post	5031
Monte Velino	8397
Vesuvius	3938
Etna	10954
Teneriff	11022
Monte Viso	9997
Hecla, in Iceland	4903
Table Hill, west Signal	3468
Pico Ruivo	5141
Carabourou	7840
Canigou	9214
Quito	9374
Pichincha	15564
El Coracon	15783
Ceraçon	15833
Chimberaco	20575

The heights of Snowden and Moel Eilio are above Carnarven Quay. The height of Schihallien is above Weem. The height of Kirk Yetton is above Leith Pier-head. The height of Skiddaw is above Derwent Lake, and of Helvellyn above Leathes Lake. The heights of Montblanc, Argentiere, Buet, Mole, Dole, Saleor, and Mont Cenis, are above the Lake of Geneva. The heights of the other mountains are above the sea. The Lake of Geneva is 1228 feet above the Mediterranean Sea, and its greatest depth is 393 feet.

ON THE RAIN GAGE.

296. The *Rain gage* is an instrument to show the quantity of rain which falls upon the earth at any place where you wish to make observations. It consists of a funnel communicating with a cylindrical tube at its bottom, into which the rain is conveyed by the funnel. The depth of the water in the cylinder is measured by a rule fixed to a float, the rule passing through the centre of the funnel. The divisions on the rule show the number of cubic inches of water that have fallen on a surface equal to the area of the top of the funnel. The funnel is so contrived as to prevent the water from evaporating.

297. To use the rain gage, so much water must first be put into the cylinder as will raise the float, so that 0 on the rule may exactly coincide with the aperture of the funnel. The gage should be firmly fixed in a place, where, whatever winds blow, the fall of the rain may not be intercepted by any obstacles. By this instrument, the mean *annual* depths of rain in inches at the place below, has been determined.

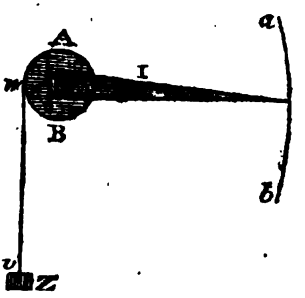
	Inches
London	21,4
Paris	19,6
Pisa in Italy	43,25
Zurich, Swisserland	32,25
Lisle, Flanders	24,0
Upminister, Essex	19,19
Townley, Lancashire	42,5
Kendal	64,5
Keswick	68,55

Mr. DALTON informs us, that the greatest quantity of rain at *Kendal* in 24 hours, in five years, 1788, 1789, 1790, 1791, 1792, was on the 22d of April, 1792, 4,592 inches; at *Keswick*, something less. In the level parts of this kingdom, and in the neighbourhood of London, the mean annual depth of rain is about 19 or 20 inches.

298. It appears that the most rain falls in places near the sea coast, and less and less as the places become more inland. The quantity which falls on the *western coast* of *England* is sometimes twice as much as falls at *London*. It is also found, that the nearer the instrument is to the ground, the more rain it collects. By experiments made by Dr. HEBERDEN, from July 1766 to July 1767, the following results were obtained; On the top of Westminster Abbey there fell 12,099 inches; on the top of a house, 18,139 inches; at the bottom of the house, 22,608 inches; these are the mean annual quantities. Mr. BARRINGTON placed two rain gages, one upon *Mount Penning* in *Wales*, and the other on the plane below; and from July to November there fell at the upper gage 8,265 inches, and at the lower 8,766 inches. Hence it appears, that the quantity of rain depends upon the nearness of the place to the earth, and not on the height of the place. In comparing therefore the quantity of rain at two places by two rain gages, they should be placed at the same distance from the earth.

ON THE HYGROMETER.

299. The *Hygrometer* is an instrument to measure the moisture and dryness of the air: and is formed of substances which will expand or contract upon any alteration of moisture. Wood expands by moisture and contracts by dryness; on the contrary, chord, catgut, &c. contract by moisture and expand by dryness; and various mechanical contrivances have been invented, to render sensible the smallest variations in the lengths of these substances. We will describe one of them, which any person may very easily make for himself.



Let AB represent the section of a cylinder moveable about its axis, which is parallel to the horizon; at the end there is an index *I* moveable against a graduated arc *ab*; about this cylinder some catgut *vw* is wound, one end of which is fixed to the cylinder, and the other end to something immoveable at Z. Now as the moisture of the air increases, the catgut contracts and turns the cylinder, and the motion of the index shows the increase of the moisture; and as the air decreases in moisture, the catgut will lengthen, and the weight of the index will carry the cylinder back, and the index will show the corresponding decrease of moisture.

300. In order to make a perfect hygrometer, such substances must be used that will contract or expand in proportion to the quantity of moisture received. Mr. DE LUC has made a great many experiments in order to find out such substances; and the result is, that whalebone and box, cut across the fibres, increase very nearly in proportion to the quantity of moisture received. He preferred the whalebone, first, on account of its steadiness, in always coming to the same point at extreme moisture; secondly, on account of its greater expansion, it increasing in length above one

eighth of itself, from extreme dryness to extreme moisture; lastly, it is more easily made thin and narrow.

301. DE SAUSSURE and DE LUC have proved by the hygrometer, that the air increases in dryness as you ascend in the atmosphere; so that in the upper attainable regions, it is constantly very dry, except in the clouds. The former gentleman has also shown, that if the whole atmosphere passed from extreme dryness to extreme moisture, the quantity of water thus evaporated would not raise the barometer half an inch. Lastly, in chemical operations on the air, the greatest quantity of evaporated water that may be supposed in them at the common temperature of the atmosphere, even if they were at extreme moisture, is not so much as the one hundredth part of their mass.

ON THE ASCENT OF VAPOURS, THE ORIGIN OF SPRINGS, AND FORMATION OF RAIN, SNOW, AND HAIL.

302. Vapours are raised from the surface of the moist earth and waters; the principal cause of which is, probably, the heat of the sun, the evaporation being always greatest when the heat is greatest. The difficulty of solving the phenomenon arises from hence, that we find a heavier fluid (water) suspended in a lighter fluid (air), contrary to the common principles of hydrostatics.

303. Dr. HALLEY supposed, that by the action of the sun upon the surface of the water, the aqueous particles become formed into hollow bubbles filled with warm and rarefied air, so as to make the whole bulk specifically lighter than air, in which case the particles will ascend. But there is great difficulty in conceiving how this can be effected. And if bubbles could be *at first* thus formed, when they ascend, the air within would soon be reduced to the same temperature of the air without, on which account they would immediately descend. The most probable supposition is, that evaporation is a chemical solution of water in air. We know that metals are dissolved in menstruums, and their particles diffused and suspended in the fluid, although their specific gravity be greater than that of the fluid. Heat promotes this solution; in the day time therefore the heat causes a more perfect solution than what can take place in the night when the air is colder; in which case, the water falls in dews and fogs. The vapours, thus raised by heat, ascend into the cold region of the atmosphere, and, not being there kept in a state of perfect solution, form clouds.

304. MARRIOTTE supposed *Springs* to be owing to rain water and melted snow, which penetrating the surfaces of hills, and running by the side of clay or rocks which it cannot penetrate, at last comes to some place where it breaks out. This would account for the phenomenon, provided the supply from these causes was sufficient. Now Dr. HALLEY has discovered a cause sufficient for a supply; for he has proved by experiment, that the vapours which are raised, afford a much greater supply than is necessary. We will give the account in his own words.

305. "We took a pan of water (salted to the degree of the saltness of the sea, by a solution of about a fortieth part of salt) about 4 inches deep, and $7\frac{9}{10}$ inches diameter, in which we placed a thermometer, and by means of a pan of coals, we brought the water to the same degree of heat which is observed to be that of the air in our hottest summers; the thermometer nicely showing it. This done, we affixed the pan of water, with the thermometer in it, to one end of the beam of the scales, and exactly counterpoised it with weights at the other end; and by the application or removal of the pan of coals, we found it very easy to maintain the water in the same degree

of heat precisely. Doing this, we found the weight of the water sensibly to decrease; and at the end of two hours we observed, that there wanted half an ounce troy, all but 7 grains, or 233 grains of water, which in that time had gone off in vapour; though one could hardly perceive it smoke, and the water was not sensibly warm. This quantity in so short a time seemed very considerable, being little less than 6 ounces in 24 hours, from so small a circle as 8 inches diameter. To reduce this experiment to an exact *calculus*, and to determine the thickness of the skin of water which had evaporated, I assume the experiment alleged by Dr. EDW. BERNARD to have been made in the *Oxford Society*, viz. that the cubic foot English of water, weighs exactly 76 pounds troy; this divided by 1728, the number of inches in a foot, will give $253\frac{1}{3}$ grains, or half an ounce $13\frac{1}{3}$ grains for the weight of a cubic inch of water; wherefore the weight of 233 grains is $\frac{233}{13\frac{1}{3}}$, or 35 parts of 38 of a cubic inch of water. Now the area of the circle, whose diameter is $7\frac{9}{10}$ inches, is 49 square inches, by which dividing the quantity of water evaporated, viz. $\frac{35}{38}$ of an inch, the quotient $1\frac{35}{1862}$, or $\frac{1}{53}$, shows that the thickness of the water evaporated was the 53d part of an inch: but we will suppose it to be only the 60th part, for the facility of calculation. If therefore water, as warm as the air in summer, exhales the thickness of the 60th part of an inch in two hours from its whole surface, in 12 hours it will exhale $\frac{1}{10}$ of an inch; which quantity will be found abundantly sufficient to serve for all the rains, springs, and dews, and account for the *Caspian Sea's* being always at a stand, neither wasting nor overflowing; as likewise for the current said to set always in at the straits of Gibraltar, though those Mediterranean Seas receive so many and so considerable rivers.

306. To estimate the quantity of water arising in vapours out of the sea, I think I ought to consider it only the time the sun is up, for that the dews return in the night as much, if not more vapours than are then emitted; and in summer the days being longer than 12 hours, this excess is balanced by the weaker rays of the sun, especially when rising before the water is warmed: so that if I allow $\frac{1}{10}$ of an inch of the surface of the sea to be raised per diem in vapours, it may not be an improbable conjecture.

307. Upon this supposition, every 10 square inches of the surface of the water, yields in vapour, per diem, a cubic inch of water; and every square foot, half a wine pint; every space of 4 square feet, a gallon; a mile square, 6914 tons; a square degree, suppose of 69 English miles, will evaporate 33 millions of tons: and if the Mediterranean be estimated at 40 degrees long, and 4 broad, allowances being made for the places where it is broader by those that are narrower, (and I am sure I guess at the least,) there will be 160 square degrees of sea; and consequently the whole Mediterranean Sea, must lose in vapour, in a summer's day, at least 5280 millions of tons. And this quantity of vapour, though very great, is as little as can be concluded from the experiment produced: and yet there remains another cause, which cannot be reduced to the rule, I mean the winds, whereby the surface of the water is licked up, somewhat faster than it exhales by the heat of the sun, as it is well known to those that have considered those drying winds which blow sometimes.

308. The Mediterranean receives these considerable rivers: the *Iberus*, the *Rhone*, the *Tiber*, the *Po*, the *Danube*, the *Niester*, the *Borysthenes*, the *Tanais*, and the *Nile*, all the rest being of no great note, and their quantity of water inconsiderable. We will suppose each of these nine rivers to bring down ten times as much water as the river

Thames, not that any of them is so great in reality, but to comprehend with them all the small rivulets that fall into the sea, which otherwise I know not how to allow for.

309. To calculate the water of the *Thames*, I assume that at *Kingston Bridge*, where the flood never reaches, and the water always runs down, the breadth of the channel is 100 yards, and its depth 3, it being reduced to an equality (in both which suppositions I am sure I take the most.) Hence, the profile of the water in this place is 300 square yards: this multiplied by 48 miles, (which I allow the water to run in 24 hours, at 2 miles in an hour) or 84480 yards, gives 25344000 cubic yards of water to be evacuated every day, that is, 20300000 tons per diem; and I doubt not but in the excess of my measure of the channel of the river, I have made more than sufficient allowance for the waters of the *Brent*, the *Wandel*, the *Lea*, and the *Derwent*, which are all worth notice, that fall into the *Thames* below *Kingston*.

310. Now if each of the aforesaid nine rivers yield ten times as much water as the Thames doth, it will follow that each of them yields but 203 millions of tons per diem, and the whole nine but 1827 millions of tons in a day; which is but little more than one-third of what is raised by vapours out of the Mediterranean in twelve hours."

311. Thus the Doctor has shown that the waters raised by vapours are vastly more than sufficient for the supply of all the rivers; the overplus may fall, partly upon the sea, and partly upon the flat lands, and not contribute to fill the rivers. We may therefore admit Mr. MARRIOTTE's solution of the cause of springs.

312. Besides the constant springs, there are others which ebb and flow alternately, which may be thus accounted for. The water, before it breaks out, may meet with a large cavity on the side of the hill, and upon the overflowing of this reservoir, it may find an aperture, and make its escape; in case of dry weather, therefore, the supply of water may not be sufficient to keep it full, in which case, the spring will cease to flow, and continue dry, till a supply causes it to overflow, and produce again the spring.

313. There is another theory to account for springs and rivers, which refers this cause to a great abyss of waters occupying the central parts of our globe. It asserts that all the phenomena of springs are chiefly derived from the vapours, veins, and issues, of this great abyss, into which they are returned; and that a perpetual circulation and equality is kept up; the springs never failing, and the sea, by reason of its communication with the subterraneous waters, never overflowing. In sinking mines and wells from 8 to 800 feet deep, it is common to break in upon powerful sources of water, and these sometimes at very great depths. Springs near the surface may have their sources from reservoirs which lie deeper, and they in their turns are fed by larger and deeper, till we come to the grand repository of all, which is supposed to keep up a communication with the sea, in consequence of which, the water in the earth has always a tendency to rise to the level of the sea. Dr. DERHAM has shown, that springs occur in great plenty, and are constant in their course, even in times of the greatest drought, where the country is in general very low, and there are no mountain tops to condense the vapours. M. GUALTERI says, that the waters discharged by the rivers in Italy into the sea, are to the rain which falls upon the land, as 55 to 27. The earth is also moistened to a greater depth than can be accounted for from the falling of the rain. From all these circumstances it is concluded, that there must be subterraneous reservoirs of water. It is not unlikely but that this, and the cause of springs and rivers assigned by Dr. HALLEY, may both operate.

314. Clouds are formed by the water raised by evaporation, and are of the same nature as dews and fogs upon the earth. When the water in the air ceases to be suspended, it falls down, and the particles uniting in falling, form drops. Various, probably, are the causes of the precipitation of the water. After the air is saturated with vapour, a sudden diminution of the density of the air, will cause it to part with some of its vapours; for as a certain quantity of air can hold but a certain quantity of water in solution, if that air become rarefied, it will not hold all its water in solution, and a precipitation will take place. As vapour is principally raised by heat, a variation of temperature will probably cause a precipitation. Also, we know by an electrometer, that the air is always in a state of electricity, sometimes positive, and sometimes negative. From M. DE SAUSSURE's observations, in winter the electricity was generally weakest in an evening, when the dew had fallen, until the sun's rising; it afterwards increased, and generally before noon it attained its maximum, and then diminished, till the fall of the dew, when it would be sometimes stronger than it had been during the whole day; after which, it would gradually diminish the whole night. In summer, in general, if the ground have been dry for some days, and the air been dry also, the electricity generally increases from the rising of the sun till 3 or 4 in the afternoon, when it is strongest; it then diminishes till the dew begins to fall, and then it increases; but after this it declines, and is very small during the night. Now BECCARIA reckons rain, hail, and snow, amongst the effects of the electricity of the atmosphere. Clouds which bring rain, he thinks, are produced in the same manner as thunder-clouds are, only by a less degree of electricity. He remarks several circumstances attending rain without lightning, which make it probable that it is produced by the same cause as when it is attended by thunder and lightning. Light has been seen amongst the clouds by night in rainy weather; and even by day, rainy clouds are seen to have a brightness evidently independent of the sun. The intensity of electricity also in his apparatus, usually corresponded very well with the quantity of rain. The phenomena also of thunder, lightning, and rain, are very frequently observed to accompany each other, which shows the connection they have with a common cause. He supposes that previous to rain, a quantity of electric matter escapes out of the earth, and in its ascent, collects a quantity of vapour, and thus the air becomes overcharged with vapours. Hence, the rain will be heavier the more vigorous the electricity is; and this is agreeable to observation. Mr. DE LUC has shown that water in a state of vapour combined with the air, produces no moistness, and therefore concludes that rain does not arise from the moisture in the atmosphere prior to the rain. The decomposition produces the moisture and then the rain. If it be very cold in these regions where the rain begins to be formed, it then descends in snow; and when the drops of rain are formed, and are descending, if in their descent they pass through a region of the air cold enough to freeze them, they descend in hail.

ON THE TEMPERATURE OF DIFFERENT PARTS OF THE EARTH.

315. The presence of the sun is one of the principal sources of heat, and its absence the cause of cold; and were these the only sources of heat and cold, in the same parallel of latitude there would be the same degree of heat or cold at the same season; but this is found to be contrary to matter of fact; the temperature of the eastern coast of North

America is much colder than the western coast of Europe, under the same latitude. Very hot days are frequently felt in the coldest climates; and very cold weather, even perpetual snow is found in countries under the equator. We must therefore seek for other causes of heat and cold, and these must evidently be partly local.

316. One great source of heat is from the earth; whether this arises from any central fire, or from a mass of heat diffused through the earth, it is not perhaps easy to say; the latter cause is perhaps the most probable; and in this case, the heat which is thus gradually lost, is renewed again by the sun. This heat imparted from the earth to the atmosphere, tends greatly to moderate the severity of the winter's cold. It is found by observation, that the same degree of heat resides in all subterraneous places at the same depth, varying a little at different depths, but is never less than 36° of FAHRENHEIT's thermometer. There is however an exception to this in mines, where there is probably some chemical operations going forwards. Mr. KIRWAN, in his *Estimate of the Temperature of different Latitudes*, and to whom we are principally indebted for what we shall here give upon this subject, observes, that at 80 or 90 feet (if this depth have any communication with the open air, and perhaps, at a much less depth, if there be no such communication) the temperature of the earth varies very little, and generally approaches to the mean annual heat. Thus the temperature of springs is nearly the same as the mean annual temperature, and varies very little in different seasons. The temperature of the cave at the observatory at *Paris* is about 53 and a half degrees, and varies about half a degree in very cold years; its depth is about 90 feet. The internal heat of the earth in our climate is always above 40°, and therefore the snow generally begins to melt first at the bottom. The next source of heat is the condensation of vapour. It is well known that vapour contains a great quantity of heat, which produces no other effect, but that of making it assume an aerial, expanded state, until the vapour is condensed into a liquid; during which condensation a certain quantity of heat escapes, and warms the surrounding atmosphere. This condensation is frequently formed by the attraction of an electrical cloud, and hence arises the great sultriness which we frequently experience before rain, and particularly before a thunder storm.

317. As the earth is one of the great sources of heat, warming the surrounding air, distance from the earth must be a source of cold; and thus we find that as you ascend in the atmosphere, the cold increases. In the vicinity of Paris, the temperature of the earth being 47°, at the estimated height of 11084 feet it was found to be 21°, or 11° below congelation, by M. CHARLES, who ascended in a balloon. And Lord MULGRAVE, at the bottom of *Hackyt-Hill*, latitude 80°, found the temperature of the air 50°; but on the top, at the height of 1503 feet, only 42°. Hence we find, that the highest mountains, even under the equator, have their tops continually covered with snow. Mr. BOUGUER found the cold of *Pinchina*, one of the *Cordelieres*, immediately under the line, to extend from 7° to 9° below the freezing point every morning before sun-rise; and hence at a certain height, which varies in almost every latitude, it constantly freezes at night all the year round, though in warm climates it thaws to some degree the next day. This height he calls the *lower Term of congelation:* between the tropics he places it at the height of 15577 feet, English measure. The next great source of cold is evaporation. The same cause which makes the condensation of vapour a source of heat, makes evaporation the source of cold; as it absorbs the fire in the latter instance, which it gives out in the former: the heat thus ab-

sorbed is called *latent* heat, it producing, in that state, no sensation of warmth. At a certain height above the lower term of congelation it never freezes, not because the cold decreases, but because the vapours do not ascend so high; this height Mr. BOUGUER calls the *upper term of congelation*, and under the equator he fixes it at the height of 28000 feet. Mr. KIRWAN has given us the following mean height of the upper and lower terms of congelation, for the latitude of every five degrees, in feet.

Lat.	Alt. *lower* Term.	Alt. *upper* Term.	Lat.	Alt. *lower* Term.	Alt. *upper* Term.
0°	15577	28000	45°	7658	13750
5	15457	27784	50	6260	11253
10	15067	27084	55	4912	8830
15	14498	26061	60	3684	6546
20	13719	24661	65	2516	4676
25	13030	23423	70	1557	2809
30	11592	20838	75	748	1346
35	10664	19169	80	120	207
40	9016	16207			

318. Sometimes the temperature of the upper air is higher than that of the lower air, particularly when a large mass of vapours is condensed by electrical agency; for no part of the heat given out by that cause being lost by communication with air much colder, that which surrounds the vapours so condensed, must be heated to a considerable degree. The clouds, by absorbing the sun's rays, are more heated than the clear air would be. These, and other circumstances, under the true height of the terms of congelation at any time, subject to considerable uncertainty.

319. The clearing away of woods lessens the vapours, and consequently diminishes the quantity of rain, and increases the temperature. Several parishes in Jamaica which used to produce fine crops of sugar-canes, are now dry for nine months in a year, and are turned into cattle-pens, through the clearing away of the woods. Hence, water is most plentiful in those countries where woods abound, and the best springs are there found. In America, since the woods in the neighbourhood of their towns have been cut down, many streams have become dry, and others have been reduced so low, as to cause great interruptions to the miller.

320. Of evaporation, the following facts may be observed: 1. That in our climates, evaporation is about four times as great from the 21st of March to the 21st of September, as from the 21st of September to the 21st of March.

2. That, other circumstances being the same, it is greater in proportion as the difference between the temperature of the air, and that of the evaporating surface is greater; and so much the smaller, as the difference is smaller; and therefore smallest, when the temperature of the air and evaporating liquor are equal. The former part of this proposition however requires some restriction; for if air be more than 15 degrees colder than the evaporating surface, there is scarce any evaporation; but on the contrary, it deposites its moisture on the surface of the liquor.

3. The degree of cold produced by evaporation, is always much greater when the air is warmer than the evaporating surface, than

that which is produced when the surface is warmer than the air. Hence, warm winds, as the *Sirocco* and *Harmatan*, are more drying than cold winds.

4. Evaporation is more copious when the air is less loaded with vapours, and is therefore greatly promoted by cold winds flowing into warmer countries.

5. Evaporation is greatly increased by a current of air or wind flowing over the evaporating surface, because unsaturated air is constantly brought into contact with it.... Hence, calm days are hottest, as has commonly been remarked.

6. Tracts of land covered with trees or vegetables, emit more vapour than the same space covered with water. Mr. WILLIAMS *(Philadelphia Transactions)* found this quantity to amount to $\frac{1}{3}$ more. Hence, the air about a wood or forest is made colder by evaporation from trees and shrubs, while the plants themselves are kept in a more moderate heat, and secured from the burning heat of the sun by the vapours perspired from the leaves. Thus, we find the shade of vegetables more effectual to cool us, as well as more agreeable, than the shade from rocks and buildings.

321. The heat and cold of different countries are transmitted from one to the other, by the medium of winds.

322. From what has been observed, it is manifest, that some situations are better fitted to receive or communicate heat, than others; thus, high and mountainous situations being nearer to the source of cold than lower situations; and countries covered with woods, as they prevent the access of the sun's rays to the earth, or to the snow which they may conceal, and present more numerous evaporating surfaces, must be colder than open countries, though situated in the same latitude. And since all tracts of land present infinite varieties of situation, uniform results cannot here be expected. Mr. KIRWAN observes therefore, that it is on water only that we must seek for a standard situation with which to compare the temperature of other situations. Now the globe contains, properly speaking, but two great tracts of water, the Atlantic Ocean, and the Pacific Ocean; which may each be divided into north and south, as they lie on the northern or southern side of the equator. In this tract of water, he chose that situation for a standard which recommends itself most by its simplicity, and freedom from any but the most permanent causes of alteration of temperature; viz. that part of the Atlantic which lies between 80° north, and 45° south latitude, and extending southward as far as the Gulf Stream, and to within a few leagues of the Coast of America; and that part of the Pacific Ocean which lies between 45° north, and 40° south latitude, and from 20° to 275° east longitude. Within this space, the mean annual temperature will be found as expressed by the following table. The temperatures beyond 80° latitude are added, though not strictly within the standard.

A Table of the *mean* Annual Temperature of the standard situation in every degree of Latitude.

Lat.	Temp.	Lat.	Temp.	Lat.	Temp.
0°	84	33°	68,3	62°	42,7
5	83,6	34	67,4	63	41,9
6	83,4	35	66,6	64	41,2
7	83,2	36	65,7	65	40,4
8	82,9	37	64,8	66	39,7
9	82,7	38	63,9	67	39,1
10	82,3	39	63	68	38,4
11	82	40	62	69	37,8
12	81,7	41	61,2	70	37,2
13	81,3	42	60,3	71	36,6
14	80,8	43	59,4	72	36
15	80,4	44	58,4	73	35,5
16	79,9	45	57,5	74	35
17	79,4	46	56,4	75	34,5
18	78,9	47	55,6	76	34,1
19	78,3	48	54,7	77	33,7
20	77,8	49	53,8	78	33,2
21	77,2	50	52,9	79	32,9
22	76,5	51	52,4	80	32,6
23	75,9	52	51,1	81	32,2
24	75,4	53	50,2	82	32
25	74,5	54	49,2	83	31,7
26	73,8	55	48,4	84	31,5
27	72,8	56	47,5	85	31,4
28	72,3	57	46,7	86	31,2
29	71,5	58	45,8	87	31,14
30	70,7	59	45,1	88	31,10
31	69,9	60	44,3	89	31,04
32	69,1	61	43,5	90	31

323. The rule by which this table has been computed, was given by the famous astronomer TOBIAS MAYER of *Gottingen*, and is as follows; it was constructed from knowing the mean and annual temperatures of two latitudes. Let s be the sine of the latitude; then the mean annual temperature will be $84-53\times s^2$; that is, *from* 84 *subtract* 53 *multiplied into the square of the sine of the latitude, and the remainder is the mean annual temperature.*

324. The temperatures of different years differ very little near the equator, but they differ more and more as you approach the poles.

325. It scarce ever freezes in latitudes under 35°, except in high situations; and it scarce ever hails in latitudes higher than 60°.

326. In latitudes between 35° and 60°, in places adjacent to the sea, it generally thaws when the sun's altitude is 40° or upwards; and seldom begins to freeze, until the sun's meridian altitude is below 40°.

327. The greatest cold in all latitudes in our hemisphere, is generally about half an hour before sunrise. The greatest heat in all latitudes between 60° and 45° is about half past two o'clock in the afternoon; between latitudes 45° and 35°, about two o'clock; between latitudes 35° and 25°, about half past one o'clock; and between latitude 25° and the equator, about one o'clock. On sea, the difference

between the heat of day and night, is not so great as on land, particularly in low latitudes.

328. In all latitudes, January is the coldest month. July is the warmest month is all latitudes above 48°; but in lower latitudes August is the warmest. The temperature of April approaches more nearly to the mean annual temperature, than any other month.

329. In the highest latitudes we often meet with an heat of 75° or 80°; and in latitudes 59° and 60° the heat of July is frequently greater than in latitude 51°.

330. All countries lying to the windward of high mountains, or extensive forests, are warmer than those to the leeward in the same latitude.

331. The vicinity to the sea is another circumstance which affects the temperature of a climate; as it moderates the heat from the land, and brings the atmosphere down to a standard best fitted to the human constitution. In our hemisphere, countries which lie to the south of any sea, are warmer than those that have the sea lie to the south of them, because the winds that should cool them in winter are mitigated by passing over the sea; whereas those which are northward of the sea, are cooler in summer by the breezes from it. A northern or southern bearing of the sea, renders a country warmer than an eastern or western bearing.

332. Islands participate more of temperature arising from the sea, and are therefore warmer than continents.

333. The soils of large tracts of land have their share in influencing the temperature of the country: Thus, stones and sand, heat and cool more readily, and, to a greater degree, than mould, hence the violent heats in the sandy deserts of *Arabia* and *Africa*; and the intense cold of *Terra del Fuego*, and other stony countries in cold latitudes.

334. Vegetables considerably affect the temperature of a climate. Wooded countries are much colder than those which are open and cultivated.

335. Every habitable latitude enjoys a heat of 60° at least, for two months, and this is necessary for the growth and maturity of corn. The quickness of vegetation in the higher latitudes proceeds from the time the sun is above the horizon. Rain is but little wanted, as the earth is sufficiently moistened by the liquefaction of the snow that covers it during the winter. In this we cannot sufficiently admire the wise disposition of Providence.

336. It is owing to the same provident hand that the globe of the earth is intersected with seas and mountains, in a manner, that seems, on its first appearance, altogether irregular and fortuitous; presenting to the eye of ignorance, the view of an immense ruin: but when the effects of these seeming irregularities on the earth are carefully inspected, they are found most beneficial, and even necessary to the welfare of its inhabitants; for to say nothing of the advantages of trade and commerce, which could not exist without seas, we have seen that it is by their vicinity, that the cold of higher latitudes is moderated, and the heat of the lower. It is by the want of seas, that the interior parts of *Asia*, as *Siberia* and *Great Tatary*, as well as those of *Africa*, are rendered almost uninhabitable; a circumstance which furnishes a strong prejudice against the opinion of those who think those countries were the original habitations of man. In the same manner, mountains are necessary; not only as the reservoirs of rivers, but as a defence against the violence of heat in the warm latitudes; without the Alps, Pyrenees, Appenine, the mountains of Dauphine, Auvergne, &c. *Italy*, *Spain*, and *France*, would be deprived of the mild temperature which they now enjoy. Without the Balgate hills, or Indian Appenine, *India* would have been a desert. Hence, *Jamaica*, *St. Domingo*, *Sumatra*, and

most other islands between the tropics, are furnished with mountains, from which the breezes proceed which refresh them.

337. The aunual heat of *London* and *Paris* is nearly the same; but from the beginning of April to the end of October, the heat is greater at Paris than at London. Hence, grapes arrive at greater perfection in the neighbourhood of Paris than about London.

338. The following table contains a comparison of the temperature of *London* with several other places. The first column contains the place; the second, the annual temperature; the third, the temperature of January, that being the coldest month; and the fourth, the temperature of July; that at London, as the standard, being estimated at 1000. The degree of *cold* is estimated in the third column, and the degree of *heat* in the fourth and second.

Places.	An. Temp.	Temp. Jan.	Temp. July.
London	1000	1000	1000
Paris	1028	1040	1037
Edinburgh	923	1040	914
Berlin	942		
Stockholm	811	1583	964
Petersburg	746	3590	1008
Vienna	987	1305	1037
Pekin	1067	1730	1283
Bourdeaux	1090	925	1139
Montpelier	1170	850	1196
Madeira	1319	559	1128
Spanish Town, in Jamaica	1557		
Madrass	1565	491	1349

339. At *London*, by a mean of the observations made at the Royal Society from 1772 to 1780, it appears that the mean annual temperature is 51°,9, or in whole numbers, 52°; and the monthly temperature is as follows:

January	35°,9
February	42,3
March	46,4
April	49,9
May	56,61
June	63,22
July	66,3
August	65,85
September	59,63
October	52,81
November	44,44
December	41,04

The greatest usual cold is 20°, and happens in January; the greatest usual heat is 81° and happens generally in July.

The limits of the annual variation are 2°,5, that is, 1° above, and 1°,5 below the mean.

The greatest variations of the mean temperature of the same month in different years, are as follows:

January	6°	July	2°
February	5	August	2
March	4	September	3,5
April	3	October	4
May	2,5	November	4
June	2	December	3

Hence it appears, that the temperatures of the summers differ much less than those of the winters.

The most usual variations of temperature within the space of 24 hours in every month, are,

January	6°	July	10°
February	8	August	15
March	20	September	18
April	18	October	14
May	14	November	9
June	12	December	6

340. At *Petersburgh*, latitude 59°. 56′, longitude 30°. 24′ E. the mean annual temperature is 38°,8, from the mean of 6 years. The greatest cold observed was that at which mercury freezes, that is, 39° below 0°; but the greatest mean degree of cold for several years was 25° below 0°. The greatest summer heat, on a mean, is 79°, yet once it amounted to 94°. It scarce ever hails at this place.

341. In latitude 79°. 50′, Lord MULGRAVE observed the greatest heat for two days to be 58°, and the least 46°. Mr. MARTIN observes, that the weather in the polar regions is very unsteady: one hour it blows a violent storm, and in the next there is a dead calm; neither does it blow long in any one point, but sometimes from every point within 24 hours. After a calm, the north wind springs up first; the sky is seldom perfectly clear, and storms are much more frequent than in lower latitudes.

342. In *Europe*, unusual cold in summer may arise, either from a long continuance of easterly or northerly winds, or from frequent and heavy rains, which are followed by great evaporations, or from a long continuance of cloudy weather in June and July, which prevents the earth from receiving its proper degree of heat.

343. The causes of unusual cold in winter may be these. 1st, *Unusual cold in the preceding summer.* For the heat in the winter being in a great measure derived from the earth, if this be deprived of its usual heat, the want of it must be perceived in winter. The cold of January 1709, was the severest, long known in Europe; and Mr. DERHAM remarked, that the preceding June was so cold, that his thermometer was near the freezing point on the 12th of that month, and the quantity of rain was much greater than usual. Mr. WOLF made the same observation in *Germany*. 2dly. *Heavy rains followed by easterly or northerly winds.* This circumstance produces great cold at any time, on account of the great evaporation which then takes place by these dry winds. It took place in October 1708, as Mr. WOLF observed; and an intense cold immediately followed. 3dly. *Westerly or southerly currents, in the upper regions of the atmosphere, whilst easterly or northerly winds prevail in the lower.* For the warm currents are deprived of their moisture, by the cold of the superior regions; and this descending in the form of snow, cools the inferior strata below their usual temperature: this circumstance also took place in 1709, when the cold was greatest. 4thly. *The arrival of Siberian, or American winds. Siberia* is 2800 miles east of *London;* but according to Mr. SMEATON's computation, a common high wind moves at the rate of 35 miles in an hour, and therefore may pass to us in 3 days from *Siberia*, and preserve much of its original degree of cold. The winds from *America* may also arrive in a few days; but their rigour will be abated by passing over the sea; but if the sea have been previously cooled by northerly winds, the westerly winds may prove very cold. Mr. DERHAM, on comparing his journals with those of Mr. ROBIE in *New England*, found, that after a few days, the *American* winds passed into *England*. The wind in 1784 was equally severe in *America*, as in *Europe*. 5thly. *The fall of a superior stratum of the atmosphere.* This will happen when a cold wind in the upper regions of the atmosphere passes over a country, the lower strata of whose atmosphere are lighter; and hence a low state of the barometer generally precedes such extraordinary cold. It is probably for this reason, that *Holland* oftener experiences a greater degree of cold, than other countries under higher latitudes; for being a moist country, its atmosphere abounds more in vapours, which renders it specifically lighter; thus, during the great cold of January 1788, the barometer was lower

than it had been known to be for 50 years before, during that month: and MUSCHENBROCK remarked, that in winter, when the mercury in the barometer descends, the cold increases.

344. Land is capable of receiving much more either heat or cold, than water. In winter when the surface of water is much cooled by contact with the colder air, the deeper and warmer water at the bottom, being specifically lighter, rises and tempers the top, and as the colder water constantly descends during the winter, in the following summer the surface is generally warmer than at greater depths; whereas in winter it is colder; hence it has been remarked, that the sea is always colder in summer and warmer in winter, after a storm, the water at great depths being mixed with that at the surface. Of the following observations, the three first were made by Lord MULGRAVE, the three next by WALES and BAYLEY, and the other by Mr. BLADH. The third column expresses the heat of the air over the surface of the sea; the fourth expresses the depth of the sea in *feet*; the fifth expresses the heat of the sea at that depth, and the sixth expresses the heat of the sea at the surface.

Latitude.	Time.	Heat of Air.	Depth.	Ht. of Sea.	Ht. of Surf.
67° N.	June 20	48,5	4680	26	
78 N.	30	40,5	708	31	
69 N.	Aug. 31	59,5	4038	32	
0	Sept. 5	75,5	510	66	74
24 S.	26	72,5	480	70	70
34. 44′ S.	Oct. 11	60,5	600	57	59
57 N.	Jan. 8	46	6	40	37
	10	43,6	50	43,6	43,6
55. 40′ N.	20	47	110	51,5	40
39. 30 N.	28	53	110	59	59
2. 55 N.	Feb. 25	81	58	81	81
2. 50 N.	26	83	110	81	84,5

345. As the water in the high northern and southern latitudes, is, by cold, rendered heavier than that in lower warm latitudes, hence arises a perpetual current from the poles to the equator, which sometimes carries down large masses of ice, which cool the air to a great extent. Inland seas of great extent have been frozen in very severe winters. In 1668, the *Baltic* was so firmly frozen, that CHARLES XI. of *Sweden*, carried his whole army over it; and the *Adriatic* was frozen in 1709. The temperatures of land and water differ more in winter than in summer; for in winter, inland countries, from lat. 49° to 70° are frequently cooled down to 40°, 50°, and some to 70° below the freezing point; whereas, the sea below lat. 76° is not colder than 4° below that point in the northern hemisphere, except some narrow seas in the north *Pacific Ocean*; but in summer, no considerable extent of land is heated to more than 15° or 20° above the temperature of the sea, stony and sandy deserts excepted.

346. The temperatures of the smaller seas, in general, if not surrounded with high mountains, are a few degrees warmer in summer, and colder in winter, than the standard ocean; in high latitudes they are frequently frozen.

347. The *white* sea is frozen in the winter.

348. The *Gulf of Bothnia* is in a great measure frozen in winter; but in summer it is sometimes heated to 70°. Its general temperature in July is from 48° to 56°.

349. The *German* sea is about 3° colder in winter and 5° warmer in summer, than the *Atlantic*.

350. The *Mediterranean* sea is, for the greater part of its extent, warmer both summer and winter, than the *Atlantic*, which, for that reason, flows into it. It is sometimes frozen in the neighbourhood of *Venice*.

351. The *Black* sea is colder than the *Mediterranean*, and flows into it.

352. The *Caspian* sea is situated in the vicinity of high mountains, and is in a great measure frozen in winter. Its level is said, by PALLAS, to be lower than the ocean.

353. Some idea may be formed what altitudes on the surface of the globe are accessible to man, by considering the height above the sea of the inferior line of perpetual snow. In the middle of the torrid zone, it appears, from Mr. BOUGUER's observations, to be elevated 5201 yards, and 4476 about the tropics. In middle latitudes there is constant snow at the height of 3300 yards. In lat. 80° north, Lord MULGRAVE found the inferior line of snow to be at the height of 400 yards: whence we may conclude, that at the poles, there is constant snow upon the surface of the earth.

ON THE DIVISIONS OF THE SURFACE OF THE EARTH.

354. The surface of the earth contains *land* and *water*. The great collection of water is called the *sea*, or the *ocean*; and this is divided into three principal parts; the *Atlantic* Ocean, which divides *Europe* and *Africa* from *America*; the *Pacific* Ocean, or *great South Sea*, which divides *Asia* from *America*; and the *Indian* Sea, which lies between *Africa* and *Malacca*, *Sumatra*, *Java*, *New Holland*, &c. Besides these, there are others which take their names from the countries against which they are situated; as the *Irish* Sea, the *German* Sea. There is also the *Mediterranean* Sea, dividing *Europe* from *Africa*; the *Black* Sea; the *Caspian* Sea, which is not connected with the other Seas; the *Red* Sea, &c. &c.

355. A *bay*, or *gulf*, is a part of the Sea running into the land, so as to have a considerable portion of it, more or less according to circumstances, bounded by shores; as the bay of *Biscay*, the bay of *Bengal* *Hudson's* bay, *Cardigan* bay; the gulf of *Venice*, the gulf of *Mexico*, the gulf of *Japan*, &c. &c. If the extent into the land be but small, it is called a *creek*, a *haven*, or a *road*.

356. A *strait*, or *straight*, is a narrow part of the sea running between two countries, and connecting two seas; as the straits of *Dover*, the straits of *Gibraltar*, the straits of *Sunda*, the straits of *Magellan*, &c. &c.

357. A considerable body of inland fresh water, is called a *lake*; as the lake of *Geneva*, lake *Ontario*, lake of *Derwent*, &c. &c.

358. A considerable stream of inland water which runs into the sea, is called a *river*; and smaller streams which run into a river, are called *brooks*.

359. A *current* is a stream of water upon the sea. Under the equator there are some very violent ones, against which a ship cannot make any way. There is one which carries a ship very swiftly from *Africa* to *America*, but it cannot return the same way. Governor POWNAL observes, that this current performs a continual circulation, setting out from the coast of *Guinea*, crossing over the *Atlantic*, setting into the gulf of *Mexico* by the south, and sweeping round by the bottom of the gulf, it issues on the north side, and goes along the coast of *North America* till it arrives at *Newfoundland*, where it is turned back across the Atlantic to the coast of Europe, and thence southward to the point from which it sets out. In *St. George's Channel* there is a current which usually sets in eastward. From the *Baltic*

a current sets into the *British Channel*. It is generally allowed, that there is always a current setting round the Capes of Finisterre and Ortegal into the bay of Biscay; and Mr. RENNELL has observed that this current is continued, and passes about N. W. by W. from the coast of France, to the westward of Scilly and Ireland. In crossing the Atlantic therefore for the English Channel, he advises the navigator to keep in the parallel of 48°. 45′, at the highest, lest the current should carry him upon the rocks of Scilly. From an ignorance of this current, many ships have been lost on those rocks.

360. A very great extent of land is called a *continent*, of which there are two; one contains *Europe*, *Asia* and *Africa*, and the other contains *America*; and these are called the four quarters of the world; the former is also called the *eastern*, and the latter the *western* continent.

361. A small extent of land surrounded by the sea, is called an *island*; as the island of *Great Britain*, the island of *Jamaica*, the island of *Java*, &c.

362. If land run out from the main land, and be joined to it by a narrow tract of land, the land so running out is called a *Peninsula*, or almost an island; and the narrow tract is called an *Isthmus*.

363. If the land project far into the sea without an isthmus, it is called a *promontory*, the end of which is called a *cape*.

ON THE COMPONENT PARTS OF THE EARTH.

364. The two grand divisions of the earth are what are usually called *land* and *water*. The subdivisions may be as follows: *earths* and *stones*; *salts*; *inflammable* substances; *metallic* substances.

365. EARTHS and STONES. Mineralogists divide these into *calcareous*, *ponderous*, *magnesian* or *muriatic*, *argillaceous*, and *siliceous*. All stones and earths consist of these substances, either singly, or mixed, or chymically combined, together with saline, inflammable and metallic substances, for they are seldom found pure. They are nearly insoluble in water, and have their specific gravities between 1 and 5, that of water being 1.

366. *Calcareous* earth, when freed from the carbonic acid by means of heat, and rendered pure from all other substances constitutes *lime*. Its specific gravity is about 2,3. It combines with all acids, and is easily soluble in the nitrous or marine, and forms diliquescent salts. There are a great many specimens of this earth; as limestone, chalk, selenite, island crystals, almost all kinds of spars, whether transparent or opaque, and many kinds of marble; all these consist of this earth combined with some acid. To these we may add, Ketton stone, Portland stone, Purbeck stone. Vegetable and animal earths are found to be calcareous; the latter, purely so; and the former for the most part, with a mixture sometimes of the calces of iron and manganese; but the greater part of the substances of vegetables is water. According to some late experiments, 33 pounds of oak afforded only 3 drachms of ashes. Hence we see why clay is unfavourable to vegetation, and how calcareous earth is introduced into the bodies of animals.

367. *Ponderous* earth, or *barytes*, has its specific gravity about 4. Its specimens are the ponderous spar, or marmor metallicum, commonly known by the name of Cawk. It combines with acids, and with the nitrous and marine it forms salts that do not deliquesce. This earth combined with the crial fluid, has been found at Alston Moor, in Cumberland, and resembles alum.

368. *Magnesian* earth has its specific gravity about 2,33. It combines with acids; and the specimens are steatites, soap-rock, French chalk, asbestos, and talk. Epsom

salt is also a combination of this earth with vitriolic acid.

369. *Argillaceous* earth, or *clay*, has its specific gravity not above 2. It combines with acids, and with the vitriolic it forms alum. It imbibes water very strongly, and, capable of being moulded into various forms, it is of great use in the arts and manufactories, for the essential ingredient in all kinds of pottery, is clay; the English stone ware is composed of pipe clay and ground flints; the yellow Queen's ware is made of the same materials, but in different proportions. China is a semivitrified earthen ware of an intermediate nature between common wares and glass. Chinese ware is composed of two ingredients, one a hard stone called *petuntse*, and the other called *kaolin*. This earth contracts very much by heat, and thence it has been made use of as a measure of very great heats, by considering the different degrees of contraction. The natural specimens are, boles, clays, marles, slates, mica, gems, &c.

370. *Siliceous* earth has its specific gravity 2,65. It is called crystalline, or vitrifiable earth, and combines with no acid, except the sparry. Extreme hardness is one of its properties, so that stones, in which it predominates, as flint, will strike fire with steel. It may be dissolved by fixed alkalis, either in the dry or wet way. Its specimens are, crystal, which is one of the purest, quartz, flints, onyx, jasper, wetstone, sand and gravel, &c. The precious stones are principally composed of argillaceous and siliceous earths. BERGMAN obtained from 100 parts of the following precious stones:

	Clay	Flint	Lime	Iron
Emerald	00	24	8	6
Sapphire	58	35	5	2
Topaz	46	39	8	6
Hyacinth	40	25	20	13
Ruby	40	89	9	10

371. Mr. KIRWAN observes, that the diamond and plumbago, cannot properly be arranged under the classes of minerals, earths, nor inflammables; but diamond has been since assigned to the latter class. A diamond is transparent, often colourless, strikes fire with steel, cuts the hardest crystals, and even rubies, being the hardest of all bodies: Its specific gravity is about 3,6. No acid but the vitriolic can affect it. In a heat somewhat greater than that in which silver melts, a diamond is entirely volatilized and consumed. Plumbago has its specific gravity from 1,987 to 2,267. It is insoluble in mineral acids. The substance is black without, but blueish white when first cut. It is used for pencils.

372. SALTS are those substances which are fusible, volatile, soluble in water, not inflammable, and sapid when applied to the tongue. In their most simple state it is a white, brittle, and in some measure a transparent mass. They are simple and compound. Simple salts are acids and alkalis; and from their union a compound salt is formed, called neutral. Earths and metals will also unite with them and form compound salts.

373. *Acids* are generally fluid, and one mark by which they may be discovered, is their property of changing to a red, the infusion of violets. They are distinguished into mineral, vegetable, and animal.

374. *Mineral* acids are the erial, the vitriolic, the marine, the nitrous, the sparry, the succinous, the phosphoric, the molybdenous, the arsenical, the tungstenic, and the sedative.

375. *Vegetable* acids are vinegar, the acids of tartar, of sugar, of sorrel, of lemons, and of benjamin.

376. *Animal* acids are, acids of milk, of sugar of milk, of ants, of tallow, of Prussian blue, and the acidum perlati.

377. *Alkalis* are of two sorts, fixed and volatile; and the fixed are either vegetable or mineral.

The mineral fixed alkali is met with in an impure state in kelp, barilla, soda. The vegetable fixed alkali is met with in an impure state in salt of tartar, pot-ash, pearl-ash, &c. The volatile alkali is never met with but as compounded with other bodies. It is sold in shops under the name of smelling salts. Alkalis change the blue infusion of violets to green.

378. INFLAMMABLES. Under this head are included those substances which are inflammable, and which do not come under the denomination of earths, salts, or metalic ores, and have general characters perfectly distinct from them. Of these, some are fluid, and some solid; the specific gravity of the latter never exceeds 2,5, and the former are the lightest of all bodies.

379. These substances are, inflammable air, or fire damp, such as is frequently found in coal-pits and mines, and this will burn when mixed with twice or thrice its bulk of common air; also, hepatic air, petrol, Barbadoes tar, mineral tallow, Scotch coal, Newcastle coal, Cannel coal, Kilkenny coal, amber, copal, sulphur, brimstone, &c.

380. Cannel coal burns with a bright light, and is so hard, that it is used to make snuff-boxes, buttons, &c. Newcastle coal will cake and become cinders. Scotch coal burns to a white ash. Kilkenny coal burns with less flame and smoak than Cannel coal, and more slowly, though intensely. The earth in this coal does not exceed $\frac{1}{20}$ of its weight; and its specific gravity is about 1,4. Wherever coals exist, slates are found near them; and salt or mineral springs in the neighbourhood.

381. METALS. These substances are opaque bodies, whose specific gravities are above 5. They are all conductors of electricity, and the best of any substances. They are soluble in nitrous acid, or in aqua regia; and all precipitable in some degree by caustic alkali. There are 17 metalic substances; gold, platina, silver, copper, iron, lead, tin, mercury, zinc, regulus of antimony, regulus of arsenic, bismuth, cobalt, nickel, regulus of manganese, and regulus of molybdena. By the action of fire and air, all metals, except gold, silver and platina, may be reduced to a substance called a *calx*, and they are then said to be calcined. The calx is heavier than the metal, owing to the pure air which is imbibed during the operation. Certain metals easily combine together; and hence they are used for *soldering*: Thus, *tin* is a solder for *lead*, *brass*, *gold*, or *silver* is a solder for *iron*.

382. Gold, silver, platina, and mercury, are called perfect metals, because when calcined, they recover their phlogiston without the addition of any phlogistic substance. Copper, iron, lead, and tin, are called imperfect metals, because they cannot be entirely reduced without the addition of some phlogistic substance. All these however (even mercury when solid) are malleable to a certain degree. The other eight are called semi-metals, and are scarcely at all malleable.

383. Gold has a specific gravity sometimes as far as 19,64; and is soluble only in aqua regia. If exposed to the utmost heat, it loses none of its weight. In its native state, it is found in lumps, or in visible grains, mixed with sand, or embodied in earths or stones. When pure, it is almost as soft as lead, and is neither elastic nor sonorous; an alloy of silver and copper, each one part to 22 of pure gold, will make it as hard as our coin.

384. Silver, when pure, has a specific gravity of 11,095; and is soluble in concentrated vitriolic acid, with the assistance of heat, and in moderately diluted nitrous acid without heat. Native silver is found in a granular, lemellar, filamentous, capillary, absorbent, or crystalized form, in various earths and stones. Also in separate masses. Pure silver is too soft to be used without alloy. In the British coinage, 15 parts of silver are alloyed with one of copper.

385. Platina, when pure, has its specific gravity very nearly 23. It is found only in the gold mines at Peru, and comes to us in the form of large smooth grains, of an irregular figure, is mixed with quartz, and a ferruginous sand. It is soluble only in aqua regia, or dephlogisticated marine acid; and is about as hard as steel.

386. Mercury, in its pure state, has a specific gravity of about 13,6, and its liquidity distinguishes it from all other metals. Native mercury is found flowing from a shistose or quartzy matrix, mixed with some other metals. In Sweden and Germany it is found united to silver in the form of a somewhat hard and brittle amalgam. It has also been found diffused through masses of clay, and some particular kind of stones. It is readily dissolved in nitrous acid, and combines with almost all metalic substances.

387. Copper has a specific gravity, from 8,7 to 9,3. It is soluble in acids, alkalis, and neutral salts. Native copper is found either in grains, or in large solid lumps, or in a foliated, capillary, arborescent form, or crystalized in quadrangular pyramids, or in clay, quartz, &c. It mixes with the other metals, and is considerably hard, and malleable. Brass is a mixture of pure copper, with a fourth part of pure zinc..... Copper mixed with tin, form gun-metal. Copper alloyed with tin, make bell-metal. Copper and lead make pot-metal. Bronze is a compound of copper and tin, to which zinc is sometimes added. Pinchbeck is a kind of brass made in imitation of gold.

388. Iron has its specific gravity from 7,6 to 8. It is soluble in all acids, and is more difficult to be fused than any of the metallic substances, platina and manganese excepted. Native iron exists in many places. Its ores are either purely calciform, as in orchres; or the calces are mixed with earths, as in spars, jasper, &c. Or the iron is mineralized with sulphur, as in pyrites. Steel is usually made by cementation from the best forged iron, with matters of the inflammable kind. Cast iron is not malleable, and so hard that a file will not touch it.

389. Lead has a specific gravity from 11,3 to 11,479. It is more or less soluble in all acids; soft, and easy of fusibility. Native lead is said to have been found in Monmouthshire in small pieces, and in some other places. The ores of lead are mostly found amongst calcareous and ponderous earths. It is also found mineralized. By heat and air, lead is converted into minium, or red lead. The calces of lead are used for painting. Lead is used as a preparation of enamels, and of porcelain as a flux, and makes the basis of the glazing of pottery wares.

390. Tin has its specific gravity from 7 to 7,45. It dissolves in spirit of salt, or aqua regia; is not quite so soft as lead, and melts the most readily of all metals. Native tin has been found in Cornwall, in the form of thin flexible laminæ, issuing out of a matrix of quartz, or regularly crystalized. The ores of tin are generally calces of that metal in a crystalized form, bedded mostly in a siliceous matrix. Pewter is a mixture of tin and lead.

391. Regulus of antimony in its pure state, has its specific gravity 6,86. Its colour is a silvery white; very brittle; and is soluble in a considerable degree by several acids. The most common ore of this metal is antimony.

392. Regulus of arsenic has its specific gravity 8,31. Its colour is bright yellowish white, but grows black by exposure to the air. It is very brittle; is easily soluble in the nitrous acid; with more difficulty in the vitriolic; and scarce at all in the marine. The ores are found principally in Saxony. It is a strong poison, and is soluble in 80 times its weight in water.

393. Bismuth has its specific gravity from 9,6 to 9,7. Its colour is reddish, or yellowish white, and it is very brittle. It is soluble in aqua

regia; scarcely in the vitriolic acid; and still less in the marine. Its ores are generally found mixed with cobalt.

394. Cobalt has its specific gravity about 7,7. It is of a blueish grey colour; is very brittle; and its fusibility is nearly as that of copper. Its calx melted with borax, pot-ash, and white siliceous sand, gives a blue glass. It is never found native.

395. Nickel has its specific gravity from 7,421 to 9. Its colour is reddish white, and it is very hard; and its fusibility is nearly as that of copper. It dissolves in nitrous acid, and aqua regia. It is found native, and also with other metals.

396. Regulus of manganese has its specific gravity 6,85. Its colour is dusky white; it is harder than iron, and very brittle; and is soluble in acids. It is not found native. If a globule of microcosmic salt be melted on a piece of charcoal, and a small piece of the black calx of this metal be added, it forms a bluish red glass.

397. Molybdena has its specific gravity 5,69. It is of a lead colour, resembling plumbago. No acids act on it, but the arsenical and nitrous.

398. Chrome, sylvanite, titanium, and other newly discovered semi-metals, are rather objects of curiosity than of utility.

399. Mr. KIRWAN divides mountains into intire, stratified, confused, and volcanic.

400. Intire mountains are formed of stone, without any regular fissure, and mostly homogeneous. They consist of granite, flagstone, limestone, gypsum, &c. and of iron ore.

401. Stratified mountains are those which are regularly divided by joints or fissures.

402. Confused mountains, are those of a confused structure, consisting of all sorts of stones heaped together, with sand, clay, and mica; but with scarcely any ores.

403. The strata of which mountains consist, are either homogeneous, or heterogeneous.

404. Homogeneous consist chiefly of argillaceous stones, or siliceous, or of both, the one behind the other. Sometimes of limestone; and sometimes the argillaceous are covered with granite, and lava..... These mountains are also, the chief seat of metallic ores, running in veins, and not in strata.

405. Heterogeneous consist of alternate strata of stones, earths, metallic ores, and sometimes lava, coal, bitumen, and petrifactions are here found. Also, salts, gold in sandy strata, iron and copper in strata, lead ore, &c.

406. Volcanic mountains appear to have some connection with the sea, for they are generally in its neighbourhood. On the top there is a hollow like an inverted cone, called the crater, through which the lava generally passes; though sometimes it bursts out on the sides, and runs a red hot river of matter, or lava. These eruptions are frequently attended with thunder, lightning, and earthquakes. In 1779, the lava of Mount Vesuvius almost destroyed the town of Torre del Greco, the inhabitants of which had scarcely time to save themselves. From the immense quantity of matter thrown up at different times, without diminishing their apparent bulk, we may conclude the seat of these fires to be many miles under ground. The explosion and eruption of the melted matter probably arise from water getting down upon the fire, and then being converted into an elastic vapour, the force of which is known to be several thousand times greater than that of gunpowder. If the superincumbent weight be too great for the force, it then may produce earthquakes without an eruption. The substances ejected are, phlogisticated, fixed, and inflammable air, water, ashes, pumice stones, stones that have undergone no fusion, and lava. Stones of 10 feet diameter are sometimes thrown to great distances.

407. Petrifactions are of shells, found on or near the surface of the earth; of fish, deeper, and of wood

the deepest. Those substances which resist putrefaction the most, are frequently found petrified; and those that are most apt to putrify, are seldom found petrified. Petrifactions are most commonly found in strata of marl, chalk, or clay; but they sometimes are found in gypsum, pyrites, ores of iron, copper, and silver. They are formed in climates where their originals could not have existed.

408. WATER, perfectly pure, is transparent, without colour, taste, or smell. When exposed to a certain degree of cold, it becomes a solid; and when exposed to a certain degree of heat, it is dissipated in vapour. It is incompressible by any human force ,but by heat and cold its bulk is increased and diminished. In an open vessel, it is incapable of receiving above a certain degree of heat; but in a confined vessel, the heat may be increased beyond that. Till lately, water was thought a simple substance, but Mr. CAVENDISH has discovered that it is a compound of two airs, inflammable and dephlogisticated, or vital air; for if these airs be burned together, water is produced, which is said to be equal in weight to that of the quantities of air made use of; it is therefore supposed, that during combustion, the latent heat that maintained the aerial form is given out.

409. Rain is the purest natural water. But water has the capacity of holding in solution a variety of substances, as earths, salts, and metals; and the water of springs receives its name from the substance it holds in solution. These waters however may be obtained pure by distillation. The substances held in solution by water, are:

410. *Fixed air.* This gives a briskness to waters, similar to that of fermenting liquors, which is chiefly observed when the water is poured from one vessel to another. It is very volatile, and escapes when the water is exposed to the air.

411. *Vitriolic, nitrous, and muriatic acid.* One or other of these exist in almost all mineral waters; but sometimes the vitriolic exists in a separate state, and gives the water an acidity.

412. *Alkaline salt.* This is found in many waters in Hungary, Tripoli, and other countries. It is usually the fossil alkali which is combined with fixed air in the Seltzer waters; and with the mineral acids in others. The vegetable and volatile alkalis rarely are found in mineral waters.

413. *Neutral salts.* These are not uncommon in springs. Common salts, nitre, and vitriolated magnesia, are most usual; the latter abounds in a spring at Epsom, and is called Epsom salts. Sal amoniac is found in springs in the neighbourhood of volcanos and burning coal mines.

414. *Earthy substances.* The calcareous earth is commonly found united with the vitriolic acid. Calcareous nitre and muriated calcareous earth are also found in springs. Waters containing only earth, or selenites, are called hard, and do not dissolve soap well.

415. *Sulphur.* Many waters by their smell seem to contain sulphur, though very few of them are found to afford it. These waters are generally impregnated with a sulphurous gas.

416. *Metals.* Of these iron is most frequent, and forms what is called the *Chalybeate* waters, and these are very common. Some waters contain copper, and more rarely zinc. Sea water contains, besides earthy and selenitic matters, a large quantity of mineral salts.

417. Of springs containing these waters, some are *cold*, and some are *hot*, sometimes almost to a degree of boiling. Mr. TISSINGTON observes, that waters flowing through a blue marl filled with pyrites, are warm; and Mr. GUETTARD has remarked, that all the hot mineral springs in *France* flow through schistus. Hence there is no occasion to derive their heat from any subterraneous volcano, as the heat may be acquired by the

waters washing the pyrites, and other like minerals in a state of spontaneous decomposition, during which they always acquire a considerable heat.

418. Sea water has been observed to contain more salt in hot than in cold climates. The quantity of common salt in sea water, is to the quantity of water, as 3 or 4 to 100; the water is therefore far from being saturated, for water is capable of dissolving nearly a fourth part of its weight of salt. Common salt is obtained from sea water by evaporation, the water thus escaping and leaving the salt behind. The water which escapes is fresh. Hence sea water may be rendered fresh, by adapting a tube to the lid of a common kettle, and condensing the steam in a hogshead as a receiver. Thus fresh water may be obtained at sea.

419. We will briefly note the composition of the waters in some of the most remarkable springs.

420 *Aix-la-Chapelle.* The waters here are hot and sulphureous. Their taste is saline, bitter, and urinous. A gallon of this water contains two scruples of sea salt, the same quantity of chalk, and 1½ drachm of fossil alkali. They are generally cathartic and diuretic, and promote perspiration. Their heat is from 106° to 130° of FAHRENHEIT's thermometer.

421. *Bath.* The waters here are hot; but have different degrees of heat in the different baths, of which there are six; the nature of the water however is the same in all. The principal baths are the *King*'s bath, the *Queen*'s bath, and the *Cross* bath. The two former raise the thermometer to 116°, and the latter to 112°. The water has a slight saline, bitterish, and chalybeate taste, and sometimes a small degree of sulphureous smell. One gallon of this water contains 23 grains of chalk, the same quantity of muriat of magnesia, 38 grains of sea salt, and 8,1 grains of ærated iron. The water operates powerfully as a diuretic, and promotes perspiration. If drank at once in large quantities it sometimes purges, but in small quantities it has a contrary effect.

422. *Bristol.* The springs here are called the *Hot wells.* The water at its origin is warm, and sparkling. It has no smell, and is pleasant to the taste. It raises the thermometer from 70° to 80°. One gallon contains 12¾ grains of chalk, 5¾ grains of muriat of magnesia, and 6½ grains of sea salt.

423. *Buxton.* The hot bath here raises the thermometer to 81° or 82°. It has a pleasant taste, and contains a little calcareous earth, with a small quantity of sea salt, and a very small portion of cathartic salt. There is also a cold chalybeate water.

424. *Cheltenham.* The water here is a cathartic chalybeate, a gallon of which contains 8 drachms of cathartic salt, partly vitriolated natron, partly vitriolated magnesia; 25 grains of magnesia, partly united with marine, and partly with aerial acid; and nearly 5 grains of iron combined with aerial acid; it yields also 24 ounce measures of fixed air, and 8 of azotic and hepatic air.

425. *Harrowgate.* Here are four springs nearly alike, except in the saline matter; of the three old ones, the highest contains 3 ounces of solid matter, the lowest 1½ ounce, and the middle one ½ ounce, of the fourth 140 grains are earth. The water is clear and sparkling, and has a strong smell of sulphur, with a salt taste, as it contains sea salt, a little marine salt of magnesia, and calcareous earth. When taken plentifully, the water is cathartic.

426. *Matlock.* Here are several springs of warm water slightly impregnated with iron. Its heat is about 69°.

Scarborough. The waters here are chalybeate and cathartic. There are two wells. In one, one gallon of water contains 52 grains of calcareous earth, 2 of ochre, and 256 of vitriolated magnesia; in the other, it contains 70 grains of calcareous

earth, 139 of vitriolated magnesia, and 11 of salt water. The waters have a brisk, pungent, chalybeate taste, at both the fountains; but at one, called the cathartic, the water tastes bitterish, which is not the case with the other, called the chalybeate.

428. *Pyrmont.* This is a brisk chalybeate, abounding in fixed air; and when taken from the fountain, sparkles very much; it has a fine, pleasant, vinous taste, and a little sulphureous smell. A gallon contains 46 grains of chalk, 15,6 of magnesia, 30 of vitriolated magnesia, 10 of sea salt, and 2,6 of zrated iron. This water is diuretic, sudorific, and in large quantity it is cathartic.

429. At *Geyser in Iceland*, there springs up a hot water, which upon cooling, deposites siliceous earth; the water is thrown to the height of 90 feet, and after its fall, its heat is 212°.

430. About 60 yards from the shore of the island of *Ischia*, at a place called *St. Angelo*, a column of boiling water bubbles on the sea, and communicates its heat to the waters about it. It boils in winter and summer, and is of great use to the inhabitants in bending their planks for ship building. The fishermen also here boil their fish. Near the shore of this island, Sir W. HAMILTON found, when bathing in the sea, many spots where the sand was so intensely hot, as to oblige him to retire quickly.

431. Water heated to 212°, when the barometer is at 29½, flies off in steam, and becomes an elastic fluid, at least 800 times rarer than air. This elastic fluid is the most powerful agent that can be employed in working machines. This steam may be reduced back to water, by projecting cold water amongst it. Upon the principle of generating steam and then destroying it, the steam engine is founded. When the steam is admitted under the piston, the piston is forced up; and when the steam is destroyed by projecting water up into the tube in which the piston works, the piston descends by the weight of the atmosphere pressing upon it. And so alternately, as long as the engine works.

432. AIR. Common atmospherical air is an elastic fluid, invisible, insipid, inodorous, and sonorous. According to the present doctrine of chemistry, it is principally composed of two airs, *dephlogisticated*, or *vital* air, and *phlogisticated* air. But besides these, the common air must be combined with other airs arising from fermentation, putrefaction, &c. and various other substances. Dephlogisticated air was discovered by Dr. PRIESTLY, and is the pure part of the atmosphere, or that part which is fit for respiration. Phlogisticated air is totally unfit for respiration, as no animal can live in it. Dr. PRIESTLY moistened various earthy substances as minium, chalk, clay, &c. with spirits of nitre, and by distillation he produced an air; and he considers this air, which he calls *dephlogisticated* air, as one of the constituent parts of the atmosphere; and that the other constituent parts are *earth* and as much *phlogiston* as is necessary to its elasticity, and to render the air as pure as it is usually found. M. LAVOISIER found that a mixture of 72 parts of phlogisticated, and 28 parts of dephlogisticated air, made a fluid like to our atmospherical air; and he concluded that the atmosphere was a mixture of these two airs; for by applying substances which have an affinity to vital air, the portion of this fluid which is in the atmospherical air, is absorbed and the residium is phlogisticated air. Other chemists suppose that it is not a mere mixture, but a chemical compound; for as the vital air is of greater specific gravity than the phlogisticated, they ought to separate, if it was only a mixture, the vital air remaining below, being of the greater specific gravity, and the other ascending. But this is not found to take place. The French chemists consider dephlogisticatvd air as

consisting of a basis called oxygene, or the acidifying principle combined with fire. That an acid is contained in the air, is probable from the change of colour induced on the tincture of turnsole by the electric spark passing through air in contact with that liquor. And this also shews that the electric spark decomposes the air, and disengages the acid. Common air is also found to dissolve several earthy and metallic substances; indicating thereby an acidity.

433. Vital air is so called, because it is peculiarly necessary to respiration; for animals will live much longer in this air than in the common air. All persons who have respired vital air, agree, that it communicates a gentle vivifying heat to the lungs, which insensibly extends to all parts of the body. And animals will live four or five times as long in this air, as in common air. But all animals die in phlogisticated air. Vital air is also necessary for combustion; for when bodies burn in common air, it is the vital part which assists combustion; for there is no combustion without this air. If you plunge a lighted candle into a vessel filled with this air, the flame becomes more ardent and bright, and the combustion is four times more rapid. Phlogisticated air is unfit for combustion. That air therefore which is necessary for the support of life, is also necessary for the support of fire; and that air which is destructive of the former is also unfit for the latter.

434. Air is necessary for vegetation, or the life of plants. For plants will not grow in vacuo. Dr. PRIESTLY discovered, that plants will not only grow in confined air, but also in air vitiated by burning and respiration, and that such air was meliorated by vegetation, and thence concluded, that vegetation was employed by nature as one mean of purifying the air, which must be continually corrupted by respiration, putrefaction and combustion. M. INGENHOUSZ has pursued this subject by a course of experiments, and established the following facts:

435. All plants possess a power of correcting foul air unfit for respiration; but this happens only in clear day light, or in the sun shine.

436. All plants yield a certain quantity of dephlogisticated air in the day time, when growing in the open air, and free from shade.

437. Plants evaporate bad air by night, and fouls the common air which surrounds them; but this is far over-balanced by their beneficial operation in the day.

438. Hence, he concludes, that the faculty which plants have of yielding dephlogisticated air, of correcting foul air, and improving ordinary air, is not owing to vegetation, as such; for if it were, plants would exert that faculty at all times, and in all places, where vegetation goes on; which is not the case. A plant may thrive well in darkness, and spread round its deletereous exhalations, and have no power to correct the badness of the air. This operation of correcting bad air, he imputes to the influence of the light of the sun upon the plant. He shews, however, that the light of the sun by itself, without the assistance of plants, does not improve air, but rather renders it worse. He found also, that plants have the faculty of absorbing air, then of elaborating it, and pouring out pure vital air; but that this takes place only in the day. He also established these facts:

439. That flowers ooze out an unwholesome air by day and by night, and spoil a considerable body of air about them.

440. That all fruits exhale a deletercous air by day and by night, and spread a poisonous quality through the surrounding air.

441. That the roots of plants, when kept out of the ground, yield, in general, bad air, and spoil common air at all times, some few excepted.

442. That dephlogisticated air from the leaves of plants, does not

exist in that state in the plant, but that the air within the leaves is purified, and the pure part escapes.

443. It appears probable, that one of the laboratories of nature for purifying the air, is placed in the leaves of trees and vegetables, and put in action by the influence of the light: and that the air thus purified is grown useless or noxious to the plant, and is thrown out principally by the excretory ducts, placed, for the most part, on the under side of the leaves; and this air being heavier than common air, it descends, and meliorates the air in which we breathe. But most foul airs are lighter than common air, and therefore they ascend, and escape us. These are striking instances of the wisdom and benevolence of Providence. The influence of the vegetable creation ceases in winter; but this loss is amply compensated by the diminution of the general cause of corruption, viz. heat; as heat greatly promotes putrefaction.

444. Dr. PRIESTLY discovered that plants thrive better in foul than in vital air; and by their having the power to correct bad air, and give out again the pure part, it follows, that the vegetable kingdom is subservient to the animal; and that air rendered noxious by animal respiration, serves to plants as a kind of nourishment.

445. The air which we breathe is rendered unfit for respiration, by receiving a portion of fixed air, which is generated in our body. We consume, by each inspiration, about 30 cubic inches of air.

446. By the experiments of Dr. HALES, we know that all bodies contain a great quantity of air in a fixed, non-elastic state; and this air is rendered elastic, and expelled from the body, by heat. He found, that from a cubic inch of heart of oak, was generated 216 cubic inches of air, the weight of which was one-fourth of the weight of the oak. A cubic inch of Newcastle coal gave out 360 cubic inches of air, which is nearly one-third of the weight of the coal. As air therefore constitutes so considerable a part of some bodies, it seems that the state in which it exists in the body, may be that of a solid, and may serve as a cohesion for the other parts. There seems to be nothing in this supposition inconsistent with other properties of air, as we know that the mixtures of two airs will produce water. That the air in the body must have been in a non-elastic state, is manifest from hence, that in the last instance, if the air which was expanded into an elastic fluid of at least 360 times its original bulk, should be compressed again into its original bulk, its elasticity would be increased 360 times, in which state, its force would be sufficient to rend a body in which it might be confined, to atoms. With the original density, therefore, it must have existed in a state of non-elasticity.

447. The airs thus produced from bodies by distillation, fermentation, &c. have different properties according to the different bodies.... There is what is called the *vinous* air, arising from vegetables; *calcareous* air, or air from calcareous earths; this is called *fixed* air; *vitriolic acid* air, arising from a mixture of vitriolic acid and inflammable substances; *inflammable* air, arising from a mixture of water, vitriolic acid, and zinc, iron, &c. And airs are formed from various other combinations of substances, from which the airs take their name: The inflammable air is that with which balloons are filled. A mixture of this and common air will take fire. It is ten times lighter than the common air. All the air thus generated, called *factitious* airs, are noxious; but most of them being lighter than common air, they ascend in the atmosphere as soon as they are formed.

448. VEGETATION. Mr. HALES, in his vegetable statics, has made a great number of experiments in order to establish the principles of vegetation; we shall therefore here give the result of his inquiries, with

some further observations on plants, and the analogy between them and the animal creation.

449. The substance of vegetables is composed of sulphur, volatile salt, water, earth, and air.

450. Water and air enter by the roots, and ascend in the respective tubes, the water forming the sap; and nature has taken care to cover the roots with a very fine thick strainer, that nothing can be admitted into them but what can readily be carried off by perspiration, vegetables having no other provision for discharging their recrement.

451. The elastic aerial fluids distend each ductile part, and by enlivening and invigorating the sap, and mixing with the other principles, they, by heat and motion, assimilate into the nourishment of the respective parts. While in this nutritive state, by the gradual cohesion of the constituent particles, they are at length formed into a firmly compacted body.

452. The sap rises all winter, but in a smaller degree than in the summer. And the perspiring matter of trees is rather actuated by warmth, and so exhaled, than protruded by the sap upwards.

453. The air enters into the vegetable, not only by the roots, but also by the trunk and leaves, especially at night, when they are changed from an expiring to an imbibing state. Part of the nourishment of vegetables arises also from the leaves plentifully imbibing dews and rain, which contain salt, sulphur, &c. the air being impregnated with these substances.

454. Leaves are also instrumental in drawing nourishment from the roots, and furnishing the young shoots with nutriment. They also contain the main excretory ducts, and separate and carry off the redundant watery fluid, which by being long detained, would turn rancid, and be prejudicial to the plant; thus leaving the more nutritive parts to coalesce.

455. The use of leaves, which are placed just where the fruit joins to the tree, is to bring nourishment to the fruit; accordingly, we find that the leaves, next adjoining to blossoms, are, in the spring, very much expanded, when the other leaves on barren shoots are but beginning to shoot: so provident is nature in making timely provision for nourishing the embryo fruit.... The pedals of leaf-stalks are also placed where nourishment is wanted to produce leaves, shoots, and fruit; and some such thin leafy expansion, is so necessary for this purpose, that nature provides small thin expansions, which may be called primary leaves, that serve to protect and draw nourishment to the young shoot and leaf-buds before the leaf itself is expanded.

456. A dilating spongy substance, by equally expanding itself every way, would not produce a long slender shoot, but rather a globose one; to prevent which, nature has provided several diaphragms, besides those at each knot, which are placed at small distances across the pith, thereby preventing its too great lateral dilatation. We may also observe, by the bye, that nature makes use of the same artifice in the growth of the feathers of birds.

457. The great quantity of moisture perspired by the branches of trees, during the cold winter season, shows the reason why a long series of cold north-easterly winds, blasts the blossoms and tender fruit, the moisture exhaling faster than it can be supplied by the trees. Hence the use of snow in covering the leafy spires of corn, in such weather.

458. The proof we have of the utility of leaves in drawing up the sap, and the care nature takes in furnishing the twigs with plenty of them, principally near the fruit, may instruct us, on one hand, not to be too lavish in pruning them off, and to be careful to leave some on the branch beyond the fruit; and on the other hand, to be careful to cut off all superfluous shoots, as they draw away a great quantity of of nourishment. Thus far Mr. HALES.

459. When a seed is sown in a reversed position, the young root turns downwards and enters the earth, and the stem bends upwards into the air. Confine a stem to an inclined position, and its extremity will soon assume a perpendicular position. Turn a branch so that the under side of the leaves may be upward, and the leaves will soon regain their natural positions..... Many leaves follow the motion of the sun; in the morning their superior surfaces are towards the east; at noon, toward the south; at evening, toward the west; and during the night, or in rainy weather, these leaves are horizontal, with their inferior surfaces toward the earth. What is called the sleep of plants, affords another instance of vegetable motion. The leaves of many plants fold up in the night, and open again in the day. And it is worthy of remark, that they all dispose themselves so as to give the best protection to the young stems, flowers, buds, or fruit. Many flowers have also the power of moving. During the night, many of them are inclosed in their calixes. Some flowers, when asleep, hang their mouths towards the earth, to prevent the noxious effects of rain or dew. If a vessel of water be set within six inches of a growing cucumber, the direction of its branches will soon tend towards the water. When a pole is placed at a considerable distance from an unsupported vine, the branches will soon tend towards the pole, and twist about it. The sensitive plant possesses the faculty of motion in a remarkable degree; the slightest touch makes its leaves suddenly shrink, and, together with the branch, bend towards the earth. These circumstances tend to prove, that plants are endowed with irritability.

460. The structure of plants, like that of animals, consists of a series of vessels disposed in a regular order. The economy and functions of vegetables, as well as those of animals, are the results of a vascular texture. The pith, or medullary substance of plants, resembles the spinal marrow of animals; and when the texture of either is destroyed, the plant or animal dies. The round bones of animals consist of concentric strata, which are easily to be separated: and the wood of plants consists of concentric layers of hardened vessels, which separate when macerated in water. A tree acquires an additional ring every year, and thus its age may be pretty accurately obtained. Animals and vegetables gradually expand from an embryo state, and sooner or later arrive at perfection. Some parts of animal bodies partake of the nature of vegetables. Thus, the hair, the nails, the beak, and the horn, are a species of vegetables, as appears from their total insensibility. There is a striking analogy between the eggs of animals and the seeds of plants. When placed in proper situations, they both produce young, similar to their parents. There is also a great similarity in the structure and uses of their respective organs. Many animals have seasons peculiar to their respective kinds. Some animals produce in the spring; others in autumn; and others in winter. And particular vegetables also have their respective seasons. And thus nature has wisely ordained, that the earth should always be covered with plants. Hence, by taking a general survey of the vegetable and animal kingdoms, it appears, that nature in their formation has operated upon one and the same great principle and model.

ON MEASURES.

461. In settling the measures of different nations in respect to their relative values; we have followed what we judged to be the best authorities, and where we could procure different measures to which we could attach equal credit for accuracy, we have taken the mean; we trust therefore that the following tables will exhibit the values of an-

cient and foreign measures with as much accuracy as the nature of the subject will admit of. The Grecian long measures were principally taken from the human body. Thus Δακτυλος is a finger's breadth; Δωρον a hand's breadth, or four fingers; Ορθοδωρον the length of the hand from the upper part to the extremity of the longest finger; Σπιθαμη the length of the hand between the thumb and little finger; Πους the foot; Πηχυς from the elbow to the extremity of the fingers; Πυγων from the elbow to the second joint of the fingers; Πυγμη from the elbow with the fingers clasped; Ορυγνια from the extremity of one middle finger to the extremity of the other, the arms being extended. In these measures they were followed by the Romans, who have *digitus*, *palmipes*, *palmus*, *pes*, *passus*, *ulna*, *cubitus*, &c.

ENGLISH MEASURES OF LENGTH.

Inches

3	Palms.								
9	3	Spans.							
12	4	1⅓	Feet.						
18	6	2	1½	Cubits.					
36	12	4	3	2	Yards.				
60	20	6⅔	5	3⅓	1⅔	Paces.			
72	24	8	6	4	2	1⅕	Fathoms.		
198	66	22	16½	11	5½	4 3/10	2¾	Poles.	
7920	2640	880	660	440	220	132	110	40	Furlongs.
63360	21120	7040	5280	3520	1760	1056	880	20	8 Mile.

Also, 4 inches=1 hand; 3 miles=1 league; and 60 geographical miles=1 degree=69,2 English miles.

462. The Scotch *Elwand* is divided into 37 inches, and is found equal to 37½ English inches; therefore a Scotch inch and foot are to the English, as 185 to 180. Itinerary measure is the same in Scotland as in England. The length of the chain is 4 poles, or 22 yards; and 80 chains make a mile. The old Scotch computed miles were about 1⅛ English miles.

463. The English *Ell* is 1¼ yard and is used in measuring linens imported from Germany and the low countries.

464. An English fathom is to a French toise, as 1000 to 1065,75. The toise contains 6 feet; the foot contains 12 inches; and the inch contains 12 lines. As the fathom and toise contain the same number of feet, an English foot is to a French foot, as 1000 to 1065,75.

ENGLISH SQUARE MEASURES.

Inches.						
144	Feet.					
1296	9	Yards.				
3600	25	2 7/9	Paces.			
39204	272 1/4	30 1/4	10,89	Poles.		
1568160	10890	1210	435,6	40	Roods.	
6272640	43560	4840	1742,4	160	4	Acres.

465. Land is measured by a chain, called *Gunter's* chain, from the inventor; its length is 4 poles=22 yards=66 feet. It consists of 100 equal links, each of which is therefore 7,92 inches. Land is estimated in acres, roods and perches. An acre contains 10 square chains; therefore 10 chains in length, and 1 in breadth, make an acre, the form being supposed that of a rectangled parallelogram. A rood is one-fourth of an acre; and a perch is the fortieth part of a rood, or it is a square pole. Hence, an acre contains 10×1=10 square chains=40×4=160 square poles = 220 × 22 = 4840 square yards=1000×100=100000 square links. Also, 625 square links=1 square pole, or a perch; 40 perches=1 rood; 4 roods=1 acre. A square mile contains 640 acres. A *hide* of land, mentioned in the earlier part of our history, contained about 100 acres.

466. In *Scotland*, the measure of the land is regulated by the ell: 36 square ells=1 fall; 40 falls=1 rood; 4 roods=1 acre. The Scotch acre is to the English, as 10000 to 7869. The length of the chain used in Scotland for measuring land, is 24 ells=72 feet.

467. In *solid* measure, 1728 inches=1 foot; and 46656 inches =27 feet=1 yard.

468. In *wine* measure, 28 7/8 solid inches=1 pint; and 231 inches=8 pints=1 gallon.

469. In *ale* measure, 35 1/4 solid inches=1 pint; and 282 inches=8 pints=1 gallon.

470. In *dry* measure, 33 3/5 solid inches=1 pint; and 268 4/5 inches=8 pints=1 gallon.

471. In *Winchester* corn measure, 34 1/3 1/2 solid inches=1 pint; and 272 1/2 inches=8 pints=1 gallon; also, 8 gallons=1 bushel.

472. The *Scotch* quart contains 210 solid inches.

473. *Forty* feet of hewn, and *fifty* of unhewn timber, make a load.

ANCIENT ROMAN MEASURES OF LENGTH.

									Engl. Yds.	Ft.	Inches.
Digitus transversus,									0.	0.	0,7266
$1\frac{1}{3}$	Uncia,								0.	0.	0,9688
4	3	Palmus minor,							0.	0.	2,90639
16	12	4	Pes,						0.	0.	11,62556
20	15	5	$1\frac{1}{4}$	Palmipes,					0.	1.	2,53195
24	18	6	$1\frac{1}{2}$	$1\frac{1}{5}$	Cubitus,				0.	1.	5,43834
40	30	10	$2\frac{1}{2}$	2	$1\frac{2}{3}$	Gradus,			0.	2.	5,0639
80	60	20	5	4	$3\frac{1}{3}$	2	Passus,		1.	1.	10,1278
10000	7500	2500	625	500	$416\frac{2}{3}$	250	125	Stadium,	201.	2.	5,975
80000	60000	20000	5000	4000	$3333\frac{1}{3}$	2000	1000	8	Milliare,	1614.	1.	11,8

Of these measures, the digit, inch, palm, foot, cubit, and pace, were in use amongst the architects; the foot, pace, stadium and mile, amongst the geographers.

474. Of the ancient Roman *superficial* measure, the *jugerum*, or acre, was the unit; and this, like the *As*, *Libra*, or any other integer, they divided as follows, the jugerum being a unit answering to the *As*, and containing in Roman and English square measure.

	Feet.	Scruples.	Engl. Roods.	Poles.	Feet.
As - -	28800	288	2	18	250,05
Deunx - -	26400	264	2	10	183,85
Dextans - -	24000	240	2	2	117,64
Dodrans - -	21600	216	1	34	51,42
Bes - -	19200	192	1	25	257,46
Septunx - -	16800	168	1	17	191,25
Semis - -	14400	144	1	9	125,03
Quincunx - -	12000	120	1	1	58,82
Triens - -	9600	96	0	32	264,85
Quadrans - -	7200	72	0	24	198,64
Sextans - -	4800	48	0	16	132,43
Uncia - -	2400	24	0	8	66,21

THE GRECIAN MEASURES OF LENGTH.

											Engl. Yds.	Ft.	Inches
Digit											0.	0.	0,75581
4	Doron,	Dochme,									0.	0.	3,02324
10	$2\frac{1}{2}$	Lichas,									0.	0.	7,5581
11	$2\frac{3}{4}$	$1\frac{1}{10}$	Orthodoron,								0.	0.	8,31392
12	3	$1\frac{1}{5}$	$1\frac{1}{11}$	Spithame,							0.	0.	9,06973
16	4	$1\frac{3}{5}$	$1\frac{5}{11}$	$1\frac{1}{3}$	Foot,						0.	1.	0,09297
18	$4\frac{1}{2}$	$1\frac{4}{5}$	$1\frac{7}{11}$	$1\frac{1}{2}$	1	Cubit.					0.	1.	1,60459
20	5	2	$1\frac{9}{11}$	$1\frac{2}{3}$	$1\frac{1}{4}$	$1\frac{1}{9}$	Pygon,				0.	1.	3,11621
24	6	$2\frac{2}{5}$	$2\frac{2}{11}$	2	$1\frac{1}{2}$	$1\frac{1}{3}$	$1\frac{1}{5}$	Cubit larger,			0.	1.	6,13945
96	24	$9\frac{3}{5}$	$8\frac{8}{11}$	8	6	$5\frac{1}{3}$	$4\frac{4}{5}$	4	Pace		2.	0.	0,5578
9600	2400	960	$872\frac{8}{11}$	800	600	$533\frac{1}{3}$	480	400	100	Stadium,	201.	1.	7,78
76800	19200	7680	$6981\frac{8}{11}$	6400	4800	$4266\frac{2}{3}$	3840	3200	800	8 Mile.	1612.	1.	2,24

The *Actus major* was 14400 feet equal to a *semis*. The *Clima* was 3600 feet equal to a *sescuncia*. The *Actus minimus* was 4800 feet equal to a *sextans*. *Actus* is the length of one furrow, or so far as the plough goes before it turns, in length 120 feet. A Scruple contains 100 square feet.

475. The stadium contained 125 geometrical paces, or 625 *Roman* feet, and answered to our furlong. There were, however, stadia of different lengths, according to different times and places. This has rendered many of the recorded Grecian measures subject to uncertainty. They had a stadium of 10 to the mile, equal to 161,0348 yards, and another, or Macedonian, equal to 115,9595 yards.

476. The Grecian *square* measure was the *plethron*, or acre, containing, according to some, 1444, or according to others, 10000 square feet; and the *aroura*, which was half the *plethron*. The *Egyptian* aroura was the square of 100 cubits.

SCRIPTURE MEASURES OF LENGTH.

							Eng. Yds.	Ft.	Inc.
Digit.							0. 0.		0,912
4	Palm,						0. 0.		3,648
12	3	Span,					0. 0.		10,944
24	6	2	Cubit,				0. 1.		9,888
96	24	8	4	Fathom,			2. 1.		3,552
144	36	12	6	1	Ezekiel's Rod,		3. 1.		11,328
192	48	16	8	2	1½	Abrabian Pole,	4. 2.		7,104
1920	480	160	80	20	13½	10 Schænus, or Measuring Line.	48. 1.		11,04

THE LONGER SCRIPTURE MEASURES.

							Eng Miles.	Yds.	Ft.
Cubit,							0.	0.	1,824
400	Stadium,						0.	243.	0,6
2000	5	Sabbath Day's Journey,					0.	1216.	0,
4000	10	2	Eastern Mile,				1.	672.	0,
12000	30	6	3	Parasang,			4.	256.	0,
96000	240	48	24	8	A Day's Journey,		33.	288.	0,

477. The east used another span equal to one third of a cubit.

478. The above are sacred measures, in the lengths of which there must necessarily be some degree of uncertainty. ARBUTHNOT makes the sacred cubit=1,7325 feet, He also observes, that the Jews sometimes made use of a profane cubit, the length of which he determined to be 1485 feet.

THE LENGTH OF LONG MEASURES OF VARIOUS COUNTRIES IN TERMS OF ENGLISH FEET AND INCHES.

	Ft.	In.		Ft.	In.
Ancient Roman Foot.	0.	11,626	Rynland or Leyden Ell	2.	3,120
Greek - - do.	1.	0,090	Frankfort - do.	1.	9,912
Arabic - - do.	0.	10,544	Hamburgh - do.	1.	10,860
Alexandria - do.	1.	2,112	Leipsic - do.	2.	3,120
Paris - - do.	1.	0,789	Lubeck - do.	1.	10,896
Rynland or Leyden do.	1.	0,361	Noremburgh - do.	2.	2,724
Amsterdam - do.	0.	11,304	Bavaria - do.	0.	11,448
Antwerp - do.	0.	11,352	Vienna - do.	1.	0,636
Dort - - do.	1.	2,208	Bononia - do.	2.	1,764
Bologne - do.	1.	2,974	Dantzic - do.	1	10,836
Turin - - do.	1.	8,222	Florence Brace, or Ell	1.	10,956
Venice - - do.	1.	1,677	Spanish Palm	0.	9,012
Padua - - do.	1.	4,866	Genoa - - do.	0.	9,960
Vienna - - do.	1.	0,444	Naples - - do.	0.	10,316
Sweden - do.	1.	2,701	Modern Roman do.	0.	8,798
Lorrain - do.	0.	11,496	Spanish - Vare	3.	0,040
Middleburgh - do.	0.	11,892	Lisbon - - do.	2.	9,000
Strasburgh do.	0.	11,040	Gibraltar - do.	2.	9,120
Bremen - do.	0.	11,568	Toledo - - do.	2.	8,220
Cologn - - do.	0.	11,448	Castile - - do.	2.	8,949
Frankf. ad Mænum do.	0.	11,376	Naples - Brace	2.	1,200
Spanish - do.	1.	0,012	Naples - Canna	6.	10,560
Toledo - do.	0.	10,788	Milan Calamus	6.	6,528
Bononia - do.	1.	2,448	Flor. Braccio da Panna	1.	10,954
Mantua - do.	1.	6,838	Russia - Archine	2.	4,242
Dantzic - do.	0.	11,328	Rome Palmodi Arcteti	0.	8,784
Copenhagen - do.	0.	11,580	Parma - Cubit	1.	10,392
Riga - - do.	1.	9,972	China - - do.	1.	0,192
Prague - do.	1.	0,312	Cairo - - do.	1.	9,888
Lyons - - Ell	3.	11.604	Old Babylonian do.	1.	6,240
Bologna - do.	2.	0,912	Turkish Pike larger	2.	2,400
Amsterdam - do.	2.	3,228	Turkish Pike smaller	2.	1,572
Antwerp - do.	2.	3,276	Persian - Arish	3.	2,364

THE LENGTH OF MILES, LEAGUES, &c. ANCIENT AND MODERN, IN ENGLISH YARDS.

	Yards.
Ancient Roman mile	1610,348
Olympic stadium = $\frac{1}{8}$ of ancient Roman mile	201,2935
Stadium = $\frac{1}{10}$ of ancient Roman mile	161,0348
Stadium = to the 1100th part of a degree	111,2
Jewish risin, of which $7\frac{1}{2}$ = ancient Roman mile	212,713
Gallic leuca = $1\frac{1}{2}$ ancient Roman mile	2415,522
German rast, or common league in France, = 2 Gal. leuca	4831,044
Persian parasang = 2 Gallic leagues	4831,044
Egyptian schœne = 4 ancient Roman miles	6441,392
German league, or that of Scandinavia, = 2 rasts	9662,088
The mile or league of Germany = 200 Rhenish yards	8239,846
Great Arabian mile, used in Palestine in the time of the Crusades, rated at $1\frac{1}{2}$ ancient Roman mile	2415,713
Modern Roman mile	1628,466
Modern Greek mile of 7 olympic stadia	1409,0545
Modern French league = 2500 toises	5328,75
Mile of Turkey, and the common werst of Russia, supposing it 7 olympic stadia	1409,0515
League of Spain = 4 ancient Roman miles	6441,392
Large league of Spain = 5 ditto	8051,74

The mile employed by the Romans in Great Britain, and restored by Henry VII, was our present English mile.

The ancient Roman mile is here estimated at 755 French fathom, 3 feet, upon the authority of D'Anville. This differs a little from the mile used in the preceding table.

THE PRESENT FRENCH MEASURES.

479. The measure of length is the *metre*; the measure of capacity is the *litre*; the measure of weight is the *gramme*; and the Agrarian measure is the *are*.

480. A *metre* is the 40 millionth part of a meridian of the earth, which, according to the last French measurement, is 39,3702 English inches; and this is the unity of length. A decimetre is $\frac{1}{10}$ of a metre; a centimetre is $\frac{1}{100}$ of a metre; a millimetre is $\frac{1}{1000}$ of a metre, &c. and a decametre is 10 metres; an hectometre is 100 metres; a kilometre is 1000 metres, &c. Thus all the multiples and submultiples are taken in a tenfold proportion; and the same for the other measures.

481. A *litre* is a cube whose side is $\frac{1}{10}$ of a metre; it contains therefore 61,0242 cubic inches; and this is the unity of solidity. A decilitre is $\frac{1}{10}$ of a litre; a centilitre is $\frac{1}{100}$ of a litre; a millilitre is $\frac{1}{1000}$ of a litre, &c. And a decalitre is 10 litres; an hectolitre is 100 litres; a kilolitre is 1000 litres, &c.

482. A *gramme* is the weight of a cube of distilled water, the side of which is $\frac{1}{100}$ of a metre; it weighs therefore 15,45 ounces troy; and this is the unity of weight. A decigramme is $\frac{1}{10}$ of a gramme; a centigramme is $\frac{1}{100}$ of a gramme; a milligramme is $\frac{1}{1000}$ of a gramme, &c. And a decagramme is 10 grammes; an hectogramme is 100 grammes; a kilogramme is 1000 grammes, &c.

483. An *are* is the square of the decametre, or 100 square metres; and this is the unity. A deciare is $\frac{1}{10}$ of an are; a centiare is $\frac{1}{100}$ of an are; a milliare is $\frac{1}{1000}$ of an are, &c And a deca-are, or decare, is 10 ares; an hectare is 100 ares; a kilare is 1000 ares, &c.

ON THE LOG LINE.

484. A log is a piece of board in the form of the quadrant of a circle, having its circular side loaded with weights, to make it swim upright. To this log is fastened a line of about 150 fathoms, called the log line; this is divided into equal spaces, called knots, each of which ought to bear the same proportion to a nautical mile, as $\frac{1}{4}$ a minute bears to an hour. They are called knots, because at the end of each of them there is fixed a piece of twine with knots in it; and these are subdivided into tenths. Now a nautical mile=6120 feet, and the $\frac{1}{120}$ part =51 feet; now $\frac{1}{2}'$: 1 hour :: 51 feet : 6120 feet, or a mile; therefore if 51 feet of the log line run off in $\frac{1}{2}'$, one mile will be run off in an hour; hence, as many knots as are run off in an hour, so many miles the ship sails in an hour. But as the ship's run is found to be rather more than that given by the log, owing to the log being drawn forward, they generally allow only 50 feet for a knot; and some commanders allow less. And to measure the time, they have a sand glass which runs out in half a minute.

485. The line runs off a reel which turns very easily; and the log is thrown from the poop, or lee quarter; and they generally let it run 12 or 15 fathom, so as to be out of the ship's wake, and then begin to count. There is commonly fastened a piece of red flag, to show where you are to begin to reckon. Care must be taken to have the hour glass and log line correct, otherwise an allowance must be made.

486. If the log line and the time of the running out of the glass be both altered in the same proportion, the number of knots run out in one glass, will still show the number of miles run in an hour; for if the knots be 40 feet and the glass run out in 24″, then 24″ : 30″ :: 40 feet :: 50 feet, so that 50 feet is still run out in half a minute.

487. In King's ships, India ships, and some others, the log is hove every hour; but in coasters, and those using short voyages, every two hours.

A TABLE

OF THE

LATITUDES AND LONGITUDES

OF THE

PRINCIPAL PLACES ON THE EARTH'S SURFACE.

A.

Names of Places.	Con.	Sea or Country.	Latitude.	Longitude. In Degrees.	Longitude. In Time.	H. W
			° ′ ″	° ′ ″	h ′ ″	h
Abbeville	Eur.	France	50 7 4 N	1 49 43 E	0 7 19 E	
Abo	Eur.	Finland	60 27 10 N	22 13 30 E	1 28 54 E	
Achem	Asia	Sumatra	5 22 0 N	95 34 0 E	6 22 16 E	
Adven. (Bay)	Asia	N. Holland	43 23 0 S	147 30 0 E	9 50 0 E	
Adven. (Isle)	Asia	Pac. Ocean	17 5 15 S	144 17 45 W	9 37 11 W	
Agde	Eur.	France	43 18 43 N	3 27 55 E	0 13 52 E	
Agen	Eur.	France	44 12 22 N	0 36 20 E	0 2 25 E	
St.Ag.(lights)	Eur.	Scillies	49 56 0 N	6 46 0 W	0 27 4 W	
Agra	Asia	India	26 43 0 N	76 44 0 E	5 6 56 E	
Aire	Eur.	France	43 41 52 N	4 55 51 E	0 19 43 E	
Aix	Eur.	France	43 31 48 N	5 26 32 E	0 21 46 E	
Alby	Eur.	France	43 55 36 N	2 8 18 E	0 8 33 E	
Aleppo	Asia	Turkey	35 11 25 N	37 10 0 E	2 28 40 E	
Alexandretta	Asia	Syria	36 35 27 N	36 15 0 E	2 25 0 E	
Alexandria	Afr.	Egypt	31 11 28 N	30 10 22 E	2 0 41 E	
Algiers	Afr.	Algiers	36 49 30 N	2 12 45 E	0 8 51 E	
Amboise	Eur.	France	47 24 54 N	0 59 7 W	0 3 56 W	
Amb. (Isle)	Asia	Pac. Ocean	16 9 30 S	168 12 30 E	11 12 50 E	
Amiens	Eur.	France	49 53 43 N	2 17 56 E	0 9 12 E	
Amsterdam	Eur.	Holland	52 21 56 N	4 51 30 E	0 19 26 E	3 0
Amst. (Isle)	Asia	Pac. Ocean	21 9 0 S	174 46 0 W	11 39 4 W	8 30
Ancona	Eur.	Italy	43 37 54 N	13 28 52 E	0 53 56 E	
Angers	Eur.	France	47 28 9 N	0 33 15 W	0 2 13 W	
Angoulême	Eur.	France	45 38 57 N	0 9 15 E	0 9 26 E	

THE LATITUDES AND LONGITUDES OF PLACES.

Names of Places.	Con.	Sea or Country.	Latitude.	Longitude. In Degrees.	Longitude. In Time.	H. W.
			° ′ ″	° ′ ″	h ′ ″	h
Angra	Eur.	Tercera	38 39 0 N	27 12 15W	1 48 49W	
Annamocka	Asia	Pac. Ocean	20 16 30 S	174 30 30W	11 38 2W	
St. Am.(Cape)	Am.	Staten Land	74 46 45 S			
Antibes	Eur.	France	43 34 43 N	7 7 20E	0 28 29 E	
Ant. (St. J.)	Am.	Carib, Sea	17 4 30 N	62 9 0W	4 8 36W	
Antwerp	Eur.	Flanders	51 13 15 N	4 22 45 E	0 17 31 E	6 0
Anvers	Eur.	Netherlands	51 13 15 N	4 24 15 E	0 17 37 E	
Apæ (Isle)	Asia	Pac. Ocean	16 46 15 S	168 27 30E	11 13 50 E	
Aracta	Asia	Turkey	36 1 0 N	38 50 0 E	2 35 20 E	
Archangel	Eur.	Russia	64 33 36 N	38 59 15E	2 35 57 E	6 0
Arica	Am	Peru	18 26 38 S	70 25 0W	4 41 40W	
Arles	Eur.	France	43 40 28 N	4 37 24 E	0 18 30 E	
Arras	Eur.	France	50 17 30 N	2 46 12 E	0 11 5 E	
Ascen. (Isle)	Afr.	S. A. Ocean	7 57 0 S	13 59 0W	0 55 56W	
Athens	Eur.	Turkey	38 5 0 N	23 52 30 E	1 35 30 E	
Auch	Eur.	France	43 38 39 N	0 34 56 E	0 2 18 E	
St. Augustin	Afr.	Madagasc.	23 35 29 S	43 8 0 E	2 52 32 E	
Aurillac	Eur.	France	44 55 10 N	2 27 0W	0 9 48W	
Aurora (Isle)	Asia	Pac. Ocean	15 8 0 S	168 17 0 E	11 13 8 E	
Autun	Eur.	France	46 56 48 N	4 17 44E	0 17 11 E	
Auxerre	Eur.	France	47 47 57 N	3 34 6E	0 14 16 E	
Auxonne	Eur.	France	47 11 24 N	5 23 35 E	0 21 34 E	
Avignon	Eur.	France	43 56 58 N	4 48 10E	0 19 13 E	
Avranches	Eur.	France	48 41 21 N	1 21 51W	0 5 27W	

B.

Babel. Straits	Afr.	Abyssinia	12 50 0 N	43 50 0E	2 55 20 E	
Babyl.(Anct.)	Asia	Mesopotam.	33 0 0 N	42 46 30 E	2 51 6 E	
Bagdad	Asia	Mesopotam.	33 19 40 N	44 24 30 E	2 57 38 E	
Barasore	Asia	India	21 20 0 N	86 0 0 E	5 44 0 E	
Ballab. (Isle)	Asia	N. Caledon.	20 7 0 S	164 22 0 E	10 57 28 E	
Balgn.(Peak)	Asia	Malacca	7 18 0 N	117 17 30 E	7 49 10 E	
Barnrey Bay	Eur.	Ireland	51 26 0 N	10 10 0W	0 40 40W	
Bab . B.Town	Am.	Atl. Ocean	13 0 0 N	59 50 0W	3 59 20W	
Bnthas (Cape)	Afr.	Sanhaga	22 16 30 N	16 40 0W	1 6 40W	
Barbuda (Isle)	Am.	Atl. Ocean	17 49 45 N	61 50 0W	4 7 20W	
Barcelona	Eur.	Spain	41 23 0 N	2 13 0 E	0 8 52 E	
Barnev. (Isle)	Am.	T. del Fueg.	55 49 0 S	66 58 0W	4 27 52W	
St.Bart. (Isle)	Asia	N. Hebrides	15 42 0 S	167 17 30 E	11 9 10 E	
Basil	Eur.	Swits.	47 35 0 N	7 29 30 E	0 29 58 E	
Bassa Terre	Am.	Guadaloupe	15 59 30 N	61 59 15W	4 7 57W	
Batavia	Asia	Java	6 12 0 S	106 53 46 E	7 7 35 E	
Bath	Eur.	England	51 22 30 N	2 21 30W	0 9 26W	
Bayeux	Eur.	France	49 16 34 N	0 42 11W	0 2 49W	
Bayonne	Eur.	France	43 29 15 N	1 28 41W	0 5 55W	3 30
Beachey Head	Eur.	England	50 44 30 N	0 19 40 E	0 1 19 E	0

THE LATITUDE AND LONGITUDE OF PLACES.

Names of Places.	Con.	Sea or Country.	Latitude.	Longitude. In Degrees.	Longitude. In Time.	H.W.
			° ′ ″	° ″ ′	h ′ ″	h
Bear (Isle)	Am.	Huds. Bay	54 34 0 N	79 56 0W	5 19 44W	12 0
Beauvais	Eur.	France	49 26 0 N	2 4 42 E	0 8 19 E	
Belle Isle	Eur.	France	47 17 17 N	3 5 0W	0 12 20W	2 30
Bembr. Point	Eur.	Isle of Wit.	50 40 15 N	1 4 45W	0 4 19W	
Bencoolen	Asia	Sumatra	3 49 16 S	102 10 30 E	6 48 42 E	
Berlin	Eur.	Germany	52 31 30 N	13 22 0 E	0 53 28 E	
Bermud.(Isle)	Am.	Atl. Ocean	32 35 0 N	63 28 0W	4 13 52W	7 0
Besanson	Eur.	France	47 14 12 N	6 2 46 E	0 24 11 E	
Besiers	Eur.	France	43 20 23 N	3 12 24 E	0 12 50 E	
Blanco (cape)	Afr.	Negroland	20 55 30 N	17 10 0W	1 8 40W	9 45
Blanco (cape)	Am.	Patagonia	47 20 0 S	64 42 0W	4 18 48W	
Blois	Eur.	France	47 35 20 N	1 20 10 E	0 5 20 E	
Bojador(cape)	Afr.	Negroland	26 12 30 N	14 27 0W	0 57 48W	0 0
Bolabola(isle)	Asia	Pac. Ocean	16 32 30 S	151 52 0W	10 7 28W	
Bologne	Eur.	France	50 43 33 N	1 36 33 E	0 6 26 E	10 30
Bologna	Eur.	Italy	44 29 36 N	11 21 15 E	0 45 25 E	
Bolschereskoi	Asia	Siberia	52 54 30 N	156 37 30 E	10 26 30 E	
Bombay	Asia	India	18 56 40 N	72 38 0 E	4 50 32 E	
Bonavia. (isle)	Afr.	At. Ocean	16 6 0 N	22 47 15W	1 31 9W	
Boston	Am.	N. England	42 22 11 N	70 59 0W	4 43 56W	
Botany Bay	Asia	N. Holland	34 0 0 S	151 21 0 E	10 5 24 E	
Botany (isl.)	Asia	N. Caledon.	22 26 40 S	167 16 45 E	11 9 7 E	
Bourbon (isle)	Afr.	Ind. Ocean	20 51 43 S	55 30 0 E	3 42 0 E	
Bourdeaux	Eur.	France	44 50 14 N	0 34 14W	0 2 17W	3 0
Bourges	Eur.	France	47 4 59 N	5 23 45 E	0 9 35 E	
Breslaw	Eur.	Silesia	51 3 0 N	17 8 45 E	1 8 35 E	
Brest	Eur.	France	48 22 42 N	4 29 19W	0 17 57W	3 45
Bridge-Town	Am.	Barbadoes	13 5 0 N	58 35 0W	3 54 20W	
St. Brieux	Eur.	France	48 31 21 N	2 43 17W	0 10 53W	
Bright.start.h.	Eur.	England	50 49 48 N	0 6 28W	0 0 26W	
Bristol (cape)	Am.	Sand.Land	59 2 30 S	26 51 0W	1 47 24W	
Brussels	Eur.	Brabant	50 50 59 N	4 21 15 E	0 17 25 E	
Buenos Ayres	Am.	Brazil	34 35 26 S	58 31 15W	3 54 5W	
Bukarest	Eur.	Walachia	44 26 45 N	26 8 0 E	1 44 32 E	
Buller (cape)	Am.	S. Georgia	53 58 30 S	37 40 0W	2 30 40W	
Burgeo (isles)	Am.	Newfound.	47 36 20 N	57 36 30W	3 50 24W	
Burlings	Eur.	Portugal	39 20 0 N	9 36 45W	0 38 27W	

C.

Cabello (Port)	Am.	Ter. Firma	10 30 50 N	67 32 0W	4 30 8W	
Cadiz	Eur.	Spain	36 32 0 N	6 16 15W	0 25 5W	4 30
Caen	Eur.	France	49 11 12 N	0 21 53W	0 1 28W	9 0
Cahors	Eur.	France	44 26 49 N	1 26 22 E	0 5 45 E	
Cairo	Afr.	Egypt	30 3 12 N	31 18 16 E	2 5 49 E	
Calais	Eur.	France	50 57 32 N	1 51 1 E	0 7 24 E	11 30
Callao	Am.	Peru	12 1 53 S	76 58 0W	5 7 51W	
Calcut.(F.W.)	Asia	India	22 34 45 N	88 29 30 E	5 53 58 E	

THE LATITUDES AND LONGITUDES OF PLACES

Names of Places.	Con.	Sea or Country.	Latitude.			Longitude. In Degrees.			Longitude. In Time.			H. W.	
			°	′	″	°	′	″	h	′	″	h	′
Calmar	Eur.	Sweden	56	40	30 N	16	21	45 E	1	5	27 E		
Cambray	Eur.	France	50	10	37 N	3	13	32 E	0	12	54 E		
Cambridge	Eur.	ngland	52	12	35 N	0	4	15 E	0	0	17 E		
Cambridge	Am.	N. England	42	23	28 N	71	4	0W	4	44	16W		
Can.(I.)n.e.p.	Afr.	Canaries	28	13	0 N	15	38	45W	1	2	35W	3	0
Candia (Isle)	Eur.	Medit. ea	35	18	35 N	25	18	0 E	1	41	12 E		
Candlem. Isles	Am.	and. Land	57	10	0 S	27	13	0W	1	48	52W		
Canso (Port)	Am.	NovaScotia	45	20	7 N	60	55	0W	4	3	40W		
Cant. Cath.	Eur.	England	51	18	26 N	1	4	53 E	0	4	19 E		
Canton	Asia	China	23	8	9 N	113	2	30 E	7	33	10E		
Cape Capricon	Asia	N. Holland	23	26	40 S	208	54	20W	13	55	57W		
Cape Clear	Eur.	Ireland	51	15	0 N	9	50	0W	0	39	20W	4	30
Cape Colenet	Asia	N. Caledon.	20	30	0 S	164	56	0 E	10	59	44 E		
Cape Comerin	Asia	India	7	56	0 N	78	5	0 E	5	22	20 E		
Cape Coronat.	Asia	N. Caledon.	22	5	0 S	167	8	0 E	11	8	32 E		
Cape Cumber	Asia	N. Hebrides	14	39	30 S	166	47	0 E	11	7	8 E		
Cape Florida	Am.	Florida	25	44	0 N	80	44	0W	5	22	56W		
Cape How	Asia	N. Holland	57	31	57 S	210	39	3W	14	2	36W		
Cape Table	Asia	N. Zealand	39	6	40 S	181	57	41W	12	7	51W		
Carlescroon	Eur.	Sweden	56	6	57 N	15	26	15 E	1	1	45 E		
Carthagena	Eur.	Spain	37	37	0 N	1	8	30W	0	4	34W		
Carthagena	Am.	Terr Firma	10	25	19 N	75	42	54W	5	2	52W		
Casan	Asia	Siberia	55	43	58 N	49	8	15 E	3	16	33 E		
Cassel	Eur.	Germany	51	19	20 N	9	35	3 E	0	38	20 E		
Castres	Eur.	France	43	36	11 N	2	14	16 E	0	8	57 E		
St.Cath.(isle)	Am.	Atl. Ocean	27	35	0 S	49	17	0W	3	17	30W		
Cavan	Eur.	Ireland	54	51	41 N	7	23	0W	0	29	32W		
Cayenne	Am.	Isle Cayen.	4	56	15 N	52	15	0W	3	29	0W		
Ceylon, S. P.	Asia	India	5	47	0 N	81	2	0 E	5	24	8 E		
Cette	Eur.	France	43	23	51 N	3	42	7 E	0	14	48 E		
Challon	Eur.	France	46	46	54 N	4	51	27 E	0	19	24 E		
Châlons	Eur.	France	48	57	28 N	4	21	29 E	0	17	26 E		
Chandernagor	Asia	India	22	51	26 N	88	29	15 E	5	53	27 E		
Q.Char.Sound	Asia	N. Zealand	41	5	58 S	174	13	32 E	11	36	54 E	9	0
Q. C.Foreland	Asia	N. Caledon.	22	15	0 S	167	12	45 E	11	8	51 E		
Q. Charl.Cape	Am.	S. Georgia	54	32	0 S	36	11	30W	2	24	46W		
Charlton Isle	Am.	Hud. Bay	52	3	0 N	79	5	0W	5	16	20W		
Chartres	Eur.	France	48	26	54 N	1	29	35 E	0	5	56 E		
Cherbourg	Eur.	France	49	38	31 N	1	37	18W	0	6	29W	7	30
Christ. Sound	Am.	T. del Fueg.	55	21	57 S	70	2	50W	4	40	11W	2	30
St. Cht. (isle)	Am.	Carib. Sea	17	15	0 N	62	43	0W	4	10	52W		
ChurchillRiv.	Am.	Hud. Bay	58	47	32 N	94	7	30W	6	16	30W	7	20
CivitaVecchia	Eur.	Italy	42	5	24 N	15	46	15 E	0	47	5 E		
Clerke's Isles	Am.	Atl. Ocean	55	5	30 S	34	42	0W	2	18	48W		
Clermont	Eur.	France	45	46	44 N	3	5	2 E	0	12	20 E		
Cochin	Asia	India	9	33	0 N	75	35	0 E	5	2	20 E		

THE LATITUDES AND LONGITUDES OF PLACES.

Names of Places.	Con.	Sea or Country.	Latitude.	Longitude. In Degrees.	Longitude. In Time.	H. W.
			° ′ ″	° ′ ″	h ′ ″	h
Colmar	Eur.	France	48 4 44 N	7 22 11 E	0 29 29 E	
Cologne	Eur.	Germany	50 55 21 N	6 55 0 E	0 27 40 E	
Compiegne	Eur.	France	49 24 59 N	2 49 41 E	0 11 10 E	
Conception	Am.	Chili	36 42 53 S	72 40 0W	4 50 40W	
Constantino.	Eur.	Turkey	41 1 27 N	28 55 0 E	1 55 40 E	
Cooper's Isle	Am.	Atl. Ocean	54 57 0 S	36 4 20W	2 24 17W	
Copenhagen	Eur.	Denmark	55 41 4 N	12 35 15 E	0 50 21 E	
Coquimbo	Am.	Chili	29 52 0 S	71 19 0W	4 45 3W	
Cork	Eur.	Ireland	51 53 54 N	8 28 15W	0 33 53W	6 30
Corvo	Eur.	Azores	39 42 0 N	31 6 0W	2 4 24W	
Countances	Eur.	France	49 2 50 N	1 27 25W	0 5 50W	
Cowes W. Fort	Eur.	Isle of Wit.	50 46 18 N	1 17 17W	0 5 9W	10 30
Cracow	Eur.	Poland	49 59 20 N	19 50 0 E	1 19 20 E	
Crensmunster	Eur.	Germany	48 3 29 N	14 7 0 E	0 56 28 E	
Croisic	Eur.	France	47 17 40 N	2 31 42W	0 10 7 E	
Cummin (Isle)	Asia	Pac. Ocean	31 40 0 N	121 4 0 E	8 4 16W	
Cyprus	Asia	Syria	34 30 0 N	33 16 0 E	2 13 4 E	
			D.			
Dantzic	Eur.	Poland	54 21 9 N	18 38 0 E	1 14 32 E	h ′
Dard. Straits	Eur.	Turkey	40 10 0 N	26 26 0 E	1 45 44 E	
Dassen Island	Afr.	Caffres	33 25 0 S	18 2 0 E	1 12 8 E	
Dax	Eur.	France	43 42 19 N	1 3 16W	0 4 13W	
Deal Castle	Eur.	England	51 13 5 N	1 23 59 E	0 5 36 E	
St. Dennis	Afr.	I. Bourbon	20 51 43 S	55 30 0 E	3 42 0 E	
Diego (Cape)	Am.	T. del Fueg.	54 33 0 S	65 14 0W	4 20 56W	
Dieppe	Eur.	France	49 55 34 N	1 4 29 E	0 4 18 E	10 30
Dijon	Eur.	France	47 19 25 N	5 1 50 E	0 20 7 E	
Dillingen	Eur.	Germany	48 34 22 N	10 14 30 E	0 40 58 E	
Disapp.(cape)	Am.	So. Georgia	54 58 0 S	36 15 0W	2 25 0W	
Dissea. (cape)	Am.	T. del Fueg	55 4 15 S	74 18 0W	4 57 12W	
Dol	Eur.	France	48 33 8 N	1 45 18W	0 7 2W	
Doming. Mole	Asia	Atl. Ocean	19 49 0 N	73 25 0W	4 53 40W	
Dominq.(isle)	Am.	Wind. Isles	15 18 23 N	61 27 55W	4 5 52W	
Dorc. Church	Eur.	England	50 42 58 N	2 25 40W	0 9 43W	
Douay	Eur.	Flanders	50 22 12 N	3 4 47 E	0 12 19 E	
Dover	Eur.	England	51 7 47 N	1 18 30 E	0 5 14 E	11 30
Dreux	Eur.	France	48 44 17 N	1 21 24 E	0 5 26 E	
Dronthiem	Eur.	Norway	63 26 2 N	10 22 0 E	0 31 28 E	
Dublin	Eur.	Ireland	53 21 11 N	6 6 30	0 24 26W	9 1
Dungeness	Eur.	England	50 52 20 N	0 59 6 E	0 3 56 E	9 4
Dunkirk	Eur.	France	51 2 11 N	2 22 23 E	0 9 30 E	0 (
Durham	Eur.	England	54 43 45 N	1 15 0W	0 5 0W	
Duskey Bay	Asia	N. Zealand	45 47 27 S	166 18 9 E	11 5 13 E	10 57
Dunnose	Eur.	England	50 33 30 N	1 16 20W	0 5 5W	9 45

THE LATITUDES AND LONGITUDES OF PLACES.

E

Names of Places.	Con.	Sea or Country.	Latitude.	Longitude. In Degrees.	Longitude. In Time.	H.W.
			° ′ ″	° ′ ″	h ′ ″	h ′
Eaoowe (Isle)	Asia	Pac. Ocean	21 24 0 S	174 30 0 W	11 38 0W	2 0
Easter Island	Am.	Pac. Ocean	27 6 30 S	109 46 45 W	7 19 7W	4 30
Edinburgh	Eur.	Scotland	55 57 57 N	3 12 15 W	0 12 49W	5 30
Edystone	Eur.	Eng. Chan.	50 8 0 N	4 24 0 W	0 17 24W	
Elsinore	Eur.	Denmark	56 0 0 N	13 35 0 E	0 54 20 E	
Embden	Eur.	Germany	53 5 0 N	7 26 0 E	0 29 44 E	
Embrun	Eur.	France	44 34 0 N	6 29 0 E	0 25 56 E	
Enatum (Isle)	Asia	Pac. Ocean	20 10 0 S	170 4 0 E	11 20 16 E	
Endeavour Ri.	Asia	N. Holland	15 27 11 S	214 50 0 W	14 19 20W	
English Road	Asia	Eaoowe	21 20 30 S	174 34 0 W	11 38 16W	
Erramanga I.	Asia	Pac. Ocean	18 46 80 S	169 18 30 E	11 17 14 E	
Erzerum	Asia	Armenia	39 56 35 N	48 35 45 E	3 14 23 E	
Eustachia T.	Am.	Carib. Sea	17 29 0 N	63 10 0 W	4 12 40W	
Evout's Isles	Am.	T. del Fueg.	55 34 30 S	66 39 0 W	4 27 56W	
Everèux	Eur.	France	49 1 36 N	1 8 54 E	0 4 35 E	
Exeter	Eur.	England	50 44 0 N	3 34 30 W	0 14 36W	

F

Falmouth	Eur.	England	50 8 0 N	5 2 30 W	0 20 10W	5 30
False (Cape)	Afr.	Caffres	34 16 0 S	18 44 0 E	1 14 56 E	
False Bay	Afr.	Caffres	34 10 0 S	18 33 0 E	1 14 12 E	
Farewel (C.)	Am.	Greenland	59 38 0 N	42 42 0 W	2 50 48W	
Farewel (C.)	Asia	N. Zealand	40 37 0 S	172 41 30 E	11 30 46 E	
Fayal Town	Eur.	Azores	38 32 20 N	28 41 5 W	1 54 44W	2 20
Ferdin.Noron.	Am.	Brazil	3 56 20 S	32 38 0 W	2 10 32W	
Ferrara	Eur.	Italy	44 49 56 N	11 36 10 E	0 46 25 E	
Ferro Isle(T.)	Afr.	Canaries	27 47 20 N	17 45 50 W	1 11 3W	
Finisterre(C.)	Eur.	Spain	42 54 0 N	9 17 10 W	0 37 9W	
Flamboro' Hd.	Eur.	England	54 8 0 N	0 11 0 E	0 0 44 E	
Florence	Eur.	Italy	43 46 30 N	11 3 30 E	0 44 14 E	
Flores	Eur.	Azores	39 34 0 N	31 0 0 W	2 4 0W	
St. Flour	Eur.	France	45 1 55 N	3 5 30 E	0 12 22 E	
Fortav. W.P.	Afr.	Canaries	28 4 0 N	14 31 30 W	0 58 6W	
Foul Point	Afr.	Madagasc.	17 40 14 S	49 53 0 E	3 19 32 E	
France (Isle)	Afr.	Indian Oc.	20 9 45 S	57 28 0 E	3 49 52 E	
Francfort Ma.	Eur.	Germany	49 55 0 N	8 35 0 E	0 34 20 E	
Francois (C.)	Am.	Hispaniola	19 46 30 N	72 10 0 W	4 49 12W	
Old C. Franc.	Am.	Hispaniola	19 40 30 N	70 2 0 W	4 40 8W	
Frawenburgh	Eur.	Prussia	54 22 15 N	20 7 30 E	1 20 30 E	
Frejus	Eur.	France	43 25 52 N	6 43 54 E	0 26 56 E	
Frekel (Cape)	Eur.	France	48 41 3 N	6 0 0 W	0 24 0W	
Friesland's P.	Am.	Sand. Land	59 2 0 S	26 55 30 W	1 47 42W	

THE LATITUDES AND LONGITUDES OF PLACES.

Names of Places.	Con.	Sea or Country.	Latitude.			Longitude. In Degrees.				Longitude. In Time.				H.W.	
			°	′	″	°	′	″		h	′	″		h	′
Fronsac (St.)	Am.	NovaScotia	45	36	57 N	61	19	30	W	4	5	18	W		
Fuego (Isle)	Afr.	Cape Verd	14	56	45 N	24	28	0	W	1	37	52	W		
Funchal	Afr.	Madeira	32	37	40 N	17	6	15	W	1	8	25	W	12	4
Furneaux Isl.	Asia	Pac. Ocean	17	11	0 S	143	6	40	W	9	28	27	W		
G															
Gap	Eur.	France	44	33	57 N	6	4	47	E	0	24	19	E		
Gabey	Asia	NewGuinea	0	6	0 S	126	23	45	E	8	25	35	E		
Genes	Eur.	Italy	44	25	0 N	8	35	45	E	0	34	23	E		
Geneva	Eur.	Savoy	46	12	0 N	6	0	0	E	0	24	0	E		
Genoa	Eur.	Italy	44	25	0 N	8	56	37	E	0	34	23	E		
St. George isle	Eur.	Azores	38	39	0 N	28	0	0	W	1	52	0	W		
St. George T.	Am.	Bermudas	32	45	0 N	63	35	0	W	4	14	20	W		
St. George Ft.	Asia	India	13	4	54 N	80	28	45	E	5	21	56	E		
St. George C.	Asia	N. Britain	4	53	30 S	153	8	45	E	10	12	35	E		
George (cape)	Am.	S. Georgia	54	17	0 S	36	32	30	W	2	26	10	W		
Ghent	Eur.	Flanders	51	3	0 N	3	43	45	E	0	14	55	E		
Gibraltar	Eur.	Spain	36	6	30 N	5	22	0	W	0	21	28	W	0	0
Gilbert's Isle	Am	T.del Fueg.	55	13	0 S	71	6	45	W	4	44	11	W		
Glasgow	Eur.	Scotland	55	51	32 N	4	15	0	W	0	17	0	W		
Goa	Asia	India	15	31	0 N	73	45	0	E	4	55	0	W		
Goat Isle	Asia	Ind. Ocean	13	55	0 N	120	2	0	E	8	0	8	E		
Gomera (Isle)	Afr.	Canaries	28	5	40 N	17	8	0	W	1	8	32	W		
Good Hope C.	Afr.	Caffres	34	29	0 S	18	23	15	E	1	13	33	E	3	0
Good Hope T.	Afr.	Caffres	33	55	42 S	18	23	15	E	1	13	33	E	2	30
Gores (Isle)	Afr.	Atl. Ocean	14	40	10 N	17	25	0	W	1	9	40	W	1	30
Gottenburg	Eur.	Sweden	57	42	0 N	11	38	45	E	0	46	35	E		
Gottengen Ob.	Eur.	Germany	51	31	54 N	9	53	0	E	0	39	32	E		
Granville	Eur.	France	48	50	16 N	1	36	15	W	0	6	25	W	7	0
Grasse	Eur.	France	43	39	19 N	6	55	9	E	0	27	41	E		
Gratiosa	Eur.	Azores	39	2	0 N	27	58	0	W	1	51	52	W		
Gratz	Eur.	Germany	47	4	9 N	15	25	45	E	1	1	48	E		
Gravelines	Eur.	Flanders	50	59	4 N	2	7	32	E	0	8	30	E	0	(
Greenw. Obs.	Eur	England	51	28	40 N	0	0	0		0	0	0			
Grenoble	Eur.	France	45	11	42 N	5	43	34	E	0	22	54	E		
Gryphiswald	Eur.	Germany	54	4	25 N	13	38	30	E	0	54	34	E		
Guadaloupe	Am.	Carib. Sea	15	59	30 N	61	48	15	W	4	7	13	W		
Guiaquil	Am.	Peru	2	11	21 S	81	11	30	W	5	24	46	W		
Gurief	Asia	Siberia	47	7	7 N	51	56	0	E	3	27	44	E		
Guernsey	Eur.	Brit. Chan.	49	30	0 N	2	47	0	W	0	11	8	W		

THE LATITUDES AND LONGITUDES OF PLACES.

H

Names of Places.	Con.	Sea or Country.	Latitude.	Longitude. In Degrees.	Longitude. In Time.	H.W.
			° ′ ″	° ′ ″	h ′ ″	h ′
Hague	Eur.	Netherlan.	52 4 10 N	4 17 30 E	0 17 10 E	8 15
Hamburg	Eur.	Netherlan.	53 3 3 N	10 1 11 E	0 39 20 E	6 0
Hang-lip cape	Afr.	Caffres	34 16 0 S	18 44 0 E	1 14 56 E	
Hanover	Eur.	Germany	52 22 18 N	9 48 15 E	0 38 57 E	
Harboro' (M.)	Eur.	England	52 28 30 N	0 57 25 W	0 3 50 W	
Harlem	Eur.	Netherlan.	52 22 14 N	4 37 0 E	0 18 28 E	
Hastings	Eur.	England	50 52 10 N	0 41 10 E	0 2 45 W	
Havannah	Am.	Cuba	23 11 52 N	82 18 30 W	5 29 14 W	
Havre-de-gr.	Eur.	France	49 29 14 N	0 6 23 E	0 0 26 E	9 0
Heese (La)	Eur.	Netherlan.	51 23 2 N	4 45 30 E	0 19 2 E	
St. Helena J.T.	Afr.	S. Atl. Oc.	15 55 0 S	5 49 0 W	0 23 16 W	
Henlopen(C.)	Am.	Virginia	38 46 0 N	75 12 30 W	5 0 50 W	
Hernosand	Eur.	Sweden	62 38 0 N	17 53 0 E	1 11 32 E	
Hervey's Isle	Asia	Pac. Ocean	19 17 0 S	158 48 0 W	10 35 12 W	
Hinchingb. I.	Asia	Pac. Ocean	17 25 0 S	168 38 0 E	11 14 32 E	
Hoai-Nghan	Asia	China	33 34 40 N	118 49 30 E	7 55 18 E	
Hogue (C. La)	Eur.	France	49 44 40 N	1 56 50 W	0 7 47 W	
Holyhead	Eur.	Wales	53 23 0 N	4 40 0 W	0 18 40 W	
Hood's Isle	Asia	Pac. Ocean	9 26 0 S	138 52 0 W	9 15 28 W	
Hoogstraeten	Eur.	Netherlan.	51 24 44 N	4 47 0 E	0 19 8 E	
Horn (Cape)	Am.	T. del Fueg.	55 58 0 S	68 13 0 W	4 29 44 W	
Hout Bay	Afr.	Caffres	34 3 0 S	18 19 0 E	1 13 16 E	
Howe's Isle	Asia	Pac. Ocean	16 46 30 S	154 6 40 W	10 16 27 W	
Huahine(Isle)	Asia	Pac. Ocean	16 44 0 S	151 6 0 W	10 4 24 W	
Hull	Eur.	England	53 50 0 N	0 28 0 W	0 1 52 W	
Hurst Castle	Eur.	England	50 42 23 N	1 32 45 W	0 6 11 W	

I. J.

Jaffa	Asia	Syria	32 5 0 N	35 10 0 E	2 20 40 E	
Jamaica (Po.)	Am.	Atl. Ocean	18 0 0 N	76 44 30 W	5 6 58 W	
Jakutskoi	Asia	Siberia	62 1 30 N	129 47 45 E	8 39 11 E	
Janeiro (Rio)	Am.	Brazil	22 54 10 S	42 43 45 W	2 50 55 W	
Jassy	Eur.	Moldavia	47 8 30 N	27 29 45 E	1 49 59 E	
Java Head	Asia	Java	6 49 0 S	106 50 0 E	7 7 20 E	
Jerusalem	Asia	Palestine	31 46 34 N	35 20 0 E	2 21 20 E	
St. Ildef. Isles	Am.	T. del Fueg.	55 51 0 S	69 21 0 W	4 37 52 W	
Immer (Isle)	Asia	Pac. Ocean	19 16 0 S	169 46 0 E	11 19 4 E	
Ingolstadt	Eur.	Germany	48 45 45 N	11 22 30 E	0 45 30 E	
St. John's	Am.	Antigua	17 4 30 N	62 9 0 W	4 8 36 W	
St. John's	Am.	Newfound.	47 32 0 N	52 26 0 W	3 29 44 W	6 0
Joppa	Asia	Syria	32 45 0 N	36 0 0 W	2 24 0 W	
St. Joseph's	Am.	California	23 3 42 S	109 42 30 W	7 18 50 W	
Irraname isle	Asia	Pac. Ocean	19 31 0 S	170 21 0 E	11 21 24 E	

THE LATITUDES AND LONGITUDES OF PLACES.

Names of Places.	Con.	Sea or Country.	Latitude.	Longitude. In Degrees.	Longitude. In Time.	H. W
			° ′ ″	° ′ ″	h ′ ″	h ′
Islamabad	Asia	India	22 20 0 N	91 45 0 E	6 7 0 E	
Isle of Pines	Asia	Pac. Ocean	22 38 0 S	167 38 0 E	11 10 32 E	
Ispahan	Asia	Persia	32 25 0 N	52 50 0 E	3 31 20 E	
St. Juan(cape)	Am.	Stat. Land	54 47 10 S	63 47 0 W	4 15 8W	
Judda	Asia	Arabia	21 29 0 N	39 22 0 E	2 37 28 E	
St. Juliana pt.	Am.	Patagonia	49 10 0 S	68 44 0 W	4 34 56W	4 45
Juthia	Asia	India	14 18 0 N	100 50 0 E	6 43 20 E	
K.						
Kedgeree	Asia	India	21 48 0 N	88 50 15 E	5 55 21 E	
Kiow	Eur.	Ukraine	50 27 0 N	30 27 30 E	2 1 50 E	
Kola	Eur.	Lapland	68 52 30 N	33 0 30 E	2 12 2 E	
L.						
Ladrone(Gr.)	Asia	Pac. Ocean	22 2 0 N	113 56 0 E	7 35 44 E	
Laguna	Afr.	Teneriffe	28 28 57 N	16 18 15 W	1 5 13W	
Lancar. E. Pt.	Afr.	Canaries	29 14 0 N	13 26 0 W	0 53 44W	
Landau	Eur.	France	49 11 38 N	8 7 30 E	0 32 30 E	
Landscroon	Eur.	Sweden	55 52 31 N	12 50 46 E	0 51 23 E	
Lands-End	Eur.	England	50 4 7 N	5 41 31 W	0 22 46W	
Langres	Eur.	France	47 52 17 N	5 19 23 E	0 21 18 E	
Lausanne	Eur.	Switzerlan.	46 31 5 N	6 45 15 E	0 27 1 E	
Lectoure	Eur.	France	43 56 2 N	0 36 53 E	0 2 28 E	
Leeds	Eur.	England	53 48 0 N	1 34 15 W	0 6 17W	
Leghorn	Eur.	Italy	43 33 0 N	10 25 0 E	0 41 40 E	
Leicester	Eur.	England	52 38 0 N	1 8 30 W	0 4 34W	
Leipsic	Eur.	Saxony	51 19 14 N	12 20 0 E	0 49 20 E	
Leper's Island	Asia	Pac. Ocean	15 23 30 S	167 58 15 E	11 11 53 E	
Leskeard	Eur.	England	50 26 55 N	4 41 45 W	0 18 47W	
Lesparre	Eur.	France	45 18 33 N	0 57 3 W	0 3 48W	
Leyden	Eur.	Holland	52 8 40 N	4 28 0 E	0 17 52 E	
Liege	Eur.	Netherlan.	50 37 30 N	5 55 0 E	0 22 20 E	
Lima	Am.	Peru	12 1 15 S	76 49 30 W	5 7 18W	
Limoges	Eur.	France	45 49 44 N	1 15 50 E	0 5 4 E	
Lintz	Eur.	Germany	48 16 0 N	13 57 30 E	0 55 50 E	
Lisieux	Eur.	France	49 8 50 N	0 13 32 E	0 0 54 E	
Lisle	Eur.	Flanders	50 37 50 N	3 4 16 E	0 12 17 E	
Lisbon	Eur.	Portugal	38 42 25 N	9 4 40 W	0 36 40W	2 15
Lion's Bank	Eur.	Atl. Ocean	56 40 0 N	17 45 0 W	1 11 0W	
Lisburne cape	Asia	N. Hebrides	15 50 45 S	166 57 0 E	11 7 48 E	
Liverpool	Eur.	England	53 22 0 N	3 10 0 W	0 12 40W	
Lizard Flags.	Eur.	England	49 57 56 N	5 11 18 W	0 20 45W	7 30
Lombes	Eur.	France	43 28 30 N	0 55 9 E	0 3 41 E	
London St. P.	Eur.	England	51 31 0 N	0 5 37 W	0 0 22½W	3 0

THE LATITUDES AND LONGITUDES OF PLACES.

Names of Places.	Con.	Sea or Country.	Latitude.	Longitude. In Degrees.	Longitude. In Time.	H.W.
			° ′ ″	° ′ ″	h ′ ″	h ′
Lorenzo cape	Am.	Peru	1 2 0 S	80 17 0 W	5 21 8W	
St. Louis port	Am.	Hispaniola	18 18 50 N	73 16 0 W	4 53 4W	
St. Louis port	Afr.	Mauritius	20 9 45 S	57 28 0 E	3 49 52 E	
Louisburg	Am.	CapeBreton	45 53 40 N	59 55 0 W	3 59 40W	
Louveau	Asia	India	12 42 30 N	101 1 30 E	6 44 6 E	
Louvain	Eur.	Netherlan.	50 53 3 N	4 44 15 E	0 18 57 E	
Lowestoffe	Eur.	England	52 29 0 N	1 44 9 E	0 6 57 E	
St. Lucia(isle)	Am.	Antilles	13 24 30 N	60 51 30 W	4 3 26W	
Lunden	Eur.	Sweden	55 42 26 N	13 12 27 E	0 52 50 E	
Luneville	Eur.	France	48 35 33 N	6 30 6 E	0 26 0 E	
Luson	Eur.	France	46 27 15 N	1 10 34 W	0 4 42W	
Luxembourg	Eur.	Netherland.	49 37 6 N	6 11 45 E	0 24 47 E	
Lyme Steeple	Eur.	England	51 4 20 N	1 1 22 E	0 4 5 E	
Lynn	Eur.	England	52 45 16 N	0 25 45 E	0 1 35 E	
Lyons	Eur	France	45 45 52 N	4 49 9 E	0 19 17 E	
		M.				
Macao	Asia	China	22 12 44 N	113 46 15 E	7 35 5 E	
Macassar	Asia	Celebes	5 9 0 S	119 48 45 E	7 59 15 E	
Madeira (Fu.)	Afr.	Atl. Ocean	32 37 40 N	16 56 0 W	1 7 44W	12 4
Madrass	Asia	India	13 4 54 N	80 28 45 E	5 21 55 E	
Mad de Di. pt.	Asia	Marquesas	9 55 30 S	139 8 40 W	9 16 35W	2 30
Madrid	Eur.	Spain	40 25 18 N	3 12 0 W	0 14 8W	
Magdal. (isle)	Asia	Pac. Ocean	10 25 30 S	138 49 0 W	9 15 16W	
Mahon (port)	Eur.	Minorca	39 50 46 N	3 48 30 E	0 15 14 E	
Majorca (isle)	Eur.	Medit. Sea	39 35 0 N	2 29 45 E	0 9 59 E	
Malacca	Asia	India	2 12 0 N	102 5 0 E	6 48 20 E	
Malines	Eur.	Netherlan.	51 1 50 N	4 28 45 E	0 17 55 E	
Mallicola isle	Asia	Pac. Ocean	16 15 30 S	167 39 15 E	11 10 37 E	
St. Maloes	Eur.	France	48 38 59 N	2 2 22 W	0 8 9W	6 0
Malta (isle)	Afr.	Medit. Sea	35 53 47 N	14 28 30 E	0 57 54 E	
Manilla	Asia	Philippines	14 36 8 N	120 52 0 E	8 3 28 E	
St. Marga. St.	Eur.	England	51 9 14 N	1 22 7 E	0 5 28 E	
Marigala. isle	Am.	Atl. Ocean	15 55 15 N	61 11 0 W	4 4 44W	
Marseilles	Eur.	France	43 17 43 N	5 21 43 E	0 21 27 E	
St. Martha	Am.	Ter. Firma	11 26 40 N	74 4 30 W	4 56 18W	
St. Mart. isle	Am.	Carib. Sea	18 4 20 N	63 2 0 W	4 12 8W	
Martin. pt. ro.	Am.	Atl. Ocean	14 35 55 N	61 9 0 W	4 4 36W	
St. Mary's isle	Eur.	Scilly Isles	49 57 30 N	6 43 0 W	0 26 52W	3 45
St. Mary's T.	Eur.	Azores	36 56 40 N	25 9 15 W	1 40 37W	
Maskely. isle	Asia	Pac. Ocean	16 32 0 S	167 59 15 E	11 11 57 E	
St. Matt. Lig.	Eur.	France	48 19 52 N	4 47 25 W	0 19 10W	
Mauritius	Afr.	Ind. Ocean	20 9 45 S	57 29 15 E	3 49 57 E	
Maurua (isle)	Asia	Pac. Ocean	16 25 40 S	152 32 40 W	10 10 11W	
Mayence	Eur.	Germany	49 54 0 N	8 20 0 E	0 33 20 E	

THE LATITUDES AND LONGITUDES OF PLACES.

Names of Places.	Con.	Sea or Country.	Latitude.	Longitude. In Degrees.	Longitude. In Time.	H.W.
			° ′ ″	° ′ ″	h ′ ″	h ′
Mayne Jo. isle	Eur.	Nor. Ocean	71 10 0 N	9 49 30 W	0 39 18W	
Mayo (isle)	Afr.	Cape Verd	15 10 0 N	23 5 0 W	1 32 20W	
Meaux	Eur.	France	48 57 40 N	2 52 30 E	0 11 30 E	
Mecca	Asia	Arabia	21 40 0 N	41 0 0 E	2 44 0 E	
Mende	Eur	France	44 31 ? N	3 29 35 E	0 13 58 E	
Mergui	Asia	Siam	12 12 0 N	98 8 45 E	6 32 35 E	
Metz	Eur.	France	49 7 10 N	6 10 13 E	0 24 41 E	
Mew Stone	Asia	New Holl.	43 48 0 S	146 27 0 E	9 45 48 E	
Mexico	Am.	Mexico	19 25 50 S	100 5 45 W	6 40 23W	
Mezieres	Eur.	France	49 45 47 N	4 43 16 E	0 18 53 E	
Miatea (isle)	Asia	Pac. Ocean	17 52 0 S	148 6 0 W	9 52 24W	
St. Mich. isle	——	Azores	37 47 0 N	25 42 0 W	1 42 48W	
Middleb. isle	Eur.	Pac. Ocean	21 20 30 S	174 34 0 W	11 38 16W	
Milan	Eur.	Italy	45 27 57 N	9 11 45 E	0 36 47 E	
Milo (isle)	Eur.	Medit. Sea	36 41 0 N	25 0 0 E	1 40 0 E	
Minor. ft. St. P.	Eur.	Medit. Sea	39 51 0 N	3 54 0 E	0 15 36 E	
Modena	Eur.	Italy	44 34 0 N	11 12 30 E	0 44 50 E	
Mons	Eur.	Netherlan.	50 27 10 N	3 57 15 E	0 15 49 E	
Montagu cape	Am.	Sand. Land	58 33 0 S	26 46 0 W	1 47 4W	
Montagu(isle)	Asia	Pac. Ocean	17 26 0 S	168 31 30 E	11 14 6 E	
Montmirail	Eur.	France	48 52 8 N	3 32 16 E	0 14 9 E	
Montpellier	Eur.	France	43 36 29 N	3 52 25 E	0 15 30 E	
Montreal	Am.	Canada	45 50 0 N	73 11 0 W	4 52 44W	
Montserr. isle	Am.	Carib. Sea	16 47 30 N	62 17 0 W	4 9 8W	
Monument the	Asia	Pac. Ocean	17 14 15 S	168 38 15 E	11 14 33 E	
Moscow	Eur.	Moscovy	55 45 45 N	37 32 45 E	2 30 11 E	
Moulins	Eur.	France	46 34 4 N	3 19 59 E	0 13 20 E	
Munich	Eur.	Bavaria	48 9 55 N	11 30 0 E	0 46 0 E	
Musketto Cov.	Am.	Greenland	64 55 13 N	52 56 45 W	3 31 47W	10 15
Muswell Hill	Eur.	England	51 35 32 N	0 7 20 W	0 0 29W	
		N.				
Namur	Eur.	Netherlan.	50 28 32 N	4 44 45 E	0 18 59 E	
Nancy	Eur.	France	48 41 55 N	6 10 16 E	0 24 41 E	
Nangasachi	Asia	Japan	32 32 0 N	128 46 15 E	8 35 5 E	
Nankin	Asia	China	32 4 40 S	118 47 0 E	7 55 8 E	
Nantes	Eur.	France	47 13 6 N	1 32 59 W	0 6 12W	3 0
Naples	Eur.	Italy	40 50 15 N	14 17 30 E	0 57 10 E	
Narbonne	Eur.	France	43 10 58 N	2 59 59 E	0 12 0 E	
Nevers	Eur.	France	46 59 17 N	3 9 16 E	0 12 37 E	
N. Year's Har.	Am.	Staten Land	54 48 55 S	64 11 0 W	4 16 44W	
Niagara	Am.	Canada	43 4 25 N	79 7 51 W	5 16 31W	
Nice	Eur.	France	43 41 47 N	7 16 22 E	0 29 5 E	
St. Nich. Mole	Am.	Hispaniola	19 49 20 N	73 29 45 W	4 53 59W	
Nieuport	Eur.	Flanders	51 7 41 N	2 45 0 E	0 11 0 E	12 0
Ningpo	Asia	China	29 57 45 N	120 18 0 E	8 1 12 E	
Nismes	Eur.	France	43 50 12 N	4 18 39 E	0 17 15 E	

THE LATITUDES AND LONGITUDES OF PLACES.

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			° ′ ″	° ′ ″	h ′ ″	h ′
Noir (Cape)	Am.	T. del Fueg.	54 32 30 S	73 3 15 W	4 48 13W	
Nootka	Am.	Pac. Ocean	49 36 6 N	126 42 30 W	8 26 50W	
Norfolk islan.	Asia	Pac. Ocean	29 1 45 N	168 10 0 E	11 12 40 E	
Noriton	Am.	Pennsylva.	40 9 56 N	75 23 30 W	5 1 34W	
North Cape	Eur.	Lapland	71 10 0 N	25 57 0 E	1 43 48 E	3 0
Cape North	Am.	S. Georgia	54 4 45 N	38 15 0 W	2 33 0W	
Noyon	Eur.	France	49 34 59 N	3 59 48 E	0 11 59 E	
Nuremberg	Eur.	Germany	49 26 55 N	11 4 0 E	0 44 16 E	
O.						
Oatipeha Bay	Asia	Otaheite	17 29 17 S	149 35 45 W	9 56 57W	
Ochoz	Asia	Tartary	59 20 10 N	143 12 30 E	9 32 50 E	
Ohaman. Har.	Asia	Uliateah	16 45 30 S	151 38 5 W	10 6 32W	11 20
Ohevahoa isle	Asia	Pac. Ocean	9 40 40 S	139 1 40 W	9 16 7W	
Ohitahoo isle	Asia	Pac. Ocean	9 55 30 S	139 6 0 W	9 16 24W	2 30
Oleron isle	Eur.	France	46 2 50 N	1 25 13 W	0 5 41W	
Olinde	Am.	Brazil	8 13 0 S	35 5 30 W	2 20 22W	
St. Omer's	Eur.	Flaaders	50 44 46 N	2 14 57 E	0 9 0 E	
Onateayo isle	Asia	Pac. Ocean	9 58 0 S	138 51 0 W	9 15 24W	
Oporto	Eur.	Portugal	41 10 0 N	8 22 0 W	0 33 8W	
Orenburg	Asia	Tartary	51 46 5 N	55 4 30 E	3 40 18 E	
Orleans	Eur.	France	47 54 10 N	1 54 27 .	0 7 38 W	
Orleans (N.)	Am.	Louisiana	29 57 45 N	89 58 45 W	5 59 55W	
Oratava	Afr.	Teneriffe	28 23 27 N	16 24 11 W	1 5 37W	
Orsk	Asia	Tartary	51 12 30 N	58 30 45 E	3 54 3 E	
Ortagal(cape)	Eur.	Spain	43 46 30 N	7 39 0 W	0 30 36W	
Osnaburg isle	Asia	Pac. Ocean	17 49 30 S	149 26 15 W	9 52 24W	
Ostend	Eur.	Netherlan.	51 13 55 N	2 55 45 E	0 11 43 E	12 0
Owharre Bay	Asia	Huahine	16 44 0 S	151. 8 15 W	10 4 33W	
Oxford (Obs.)	Eur.	England	51 45 38 N	1 15 30 W	0 5 2W	
P.						
Padua	Eur.	Italy	45 23 40 N	11 52 30 E	0 47 30 E	
Paita	Am.	Peru	5 12 0 S			
Palliser's isles	Asia	Pac. Ocean	15 38 15 S	146 30 15 W	9 46 1W	
Palliser(cape)	Asia	N. Zealand	41 38 0 S	175 18 0 E	11 44 30 E	
Palma (isle)	Afr.	Canaries	28 36 45 N	17 50 0 W	1 11 20W	
Palmers.(isle)	Asia	Pac. Ocean	18 0 0 S	162 57 0 W	10 51 48W	
Panama	Am.	Mexico	8 47 48 N	80 21 0 W	5 21 24W	
Paoom (isle)	Asia	Pac. Ocean	16 30 0 S	168 28 45 E	11 13 55 E	
Paris (Obs.)	Eur.	France	48 50 14 N	2 20 0 E	0 9 20 E	
Patrixfiord	Eur.	Iceland	65 35 45 N	24 10 0 W	1 36 40W	
Pau	Eur.	France	43 15 0 N	0 9 0 W	0 0 36W	
St. Paul's isle	Afr.	Ind. Ocean	37 51 0 S	77 48 0 E	5 11 12 E	
St. Paul de L.	Eur.	France	48 40 55 N	4 0 21 W	0 16 1W	4 0

THE LATITUDES AND LONGITUDES OF PLACES.

Names of Places.	Con.	Sea or Country.	Latitude.	Longitude. In Degrees.	Longitude. In Time.	H. W.
			° ′ ″	° ′ ″	h ′ ″	h ′
Pekin	Asia	China	39 54 13 N	116 27 30 E	7 45 50 E	
Perigueux	Eur.	France	45 11 8 N	0 43 9 E	0 2 53 E	
Perinaldi	Eur.	Italy	43 53 20 N	7 40 0 E	0 30 40 E	
Perpignan	Eur.	France	42 41 53 N	2 53 35 E	0 11 34 E	
St. Peter's Ft.	Am.	Martinico	14 44 0 N	61 21 16 W	4 5 25W	
St. Peter's Isle	Am.	Atl. Ocean	46 46 30 N	56 17 0 W	3 45 8W	
Petersburg	Eur.	Russia	59 56 23 N	30 19 0 E	2 1 16 E	
Petit Goave	Am.	Hispaniola	18 27 0 N	72 52 30 W	4 51 30 E	
Petropawlos.	Asia	Kamchatka	53 1 20 N	158 48 0 E	10 35 13 E	
Philadelphia	Am.	Pennsylva.	39 56 55 N	75 13 30 W	5 0 54W	
St. Philip's Ft.	Eur.	Minorca	39 50 46 N	3 48 30 E	0 15 14 E	
Pickersg. isle	Am.	Atl. Ocean	54 42 30 S	36 58 0 W	2 27 52W	
Pickersg. Har.	Asia	N. Zealand	45 47 27 S	166 18 9 E	11 5 13 E	
Pico	Eur.	Azores	38 28 40 N	28 26 0 W	1 53 44W	
Pines (Isle)	Asia	N. Caledon.	22 38 0 S	167 38 0 E	11 10 32 E	
Pisa	Eur.	Italy	43 43 7 N	10 23 0 E	0 41 32 E	
Plym. Garais.	Eur.	England	50 21 22 N	4 7 24 W	0 16 30W	6 0
Poitiers	Eur.	France	46 34 50 N	0 20 48 E	0 1 23 E	
Pollingen	Eur.	Germany	47 48 17 N	11 7 17 E	0 44 29 E	
Poole Church	Eur.	England	50 42 50 N	1 58 55 W	0 7 56W	
Pondicherry	Asia	India	11 41 55 N	79 52 45 E	5 19 31 E	
Ponoi	Eur.	Lapland	67 4 30 N	36 23 15 E	2 25 33 E	
Pontoise	Eur.	France	49 3 2 N	2 5 37 E	0 8 22 E	
Portl. Light-h.	Eur.	England	50 31 22 N	2 26 49 W	0 9 47W	
Porto Bello	Am.	Mexico	9 33 5 N	79 50 20 W	5 19 21W	
Por. San. (isle)	Afr.	Madeira	32 58 15 N	16 25 15 W	1 5 41W	
Port Royal	Am.	Jamaica	18 0 0 N	76 45 30 W	5 7 2W	
Port Royal	Am.	Martinico	14 35 55 N	61 9 0 W	4 4 36W	
Portsm. Chur.	Eur.	England	50 47 27 N	1 5 57 W	0 4 24W	11 15
Portsm. Acad.	Eur.	England	50 48 2 N	1 6 1 W	0 4 24W	
Portl. (Isle)	Eur.	North Sea	63 22 0 N	18 54 0 W	1 15 36W	
Portl. (Isle)	Asia	Pac. Ocean	39 25 0 S	178 12 0 E	11 52 48 E	
Port Paix	Am.	Hispaniola	19 58 0 N	73 2 0 W	4 48 8W	
Port Praya	Afr.	St. Jago	14 53 53 N	23 29 22 W	1 33 57W	11 0
Prague	Eur.	Bohemia	50 5 47 N	14 24 0	0 57 36	
Pr. of W.'s Ft.	Am.	New Wales	58 47 32 N	94 7 30 W	6 16 30W	
Providence	Am.	N. England	41 50 40 N	71 26 0 W	4 45 44W	
Pudyoua	Asia	N. Caledon.	20 18 0 S	164 41 14 E	10 58 45 E	6 30
Pulo Con. Isle	Asia	Ind. Ocean	8 40 0 N	107 20 0 E	7 9 20 E	
Pulo Ti. (Isle)	Asia	Gulph Siam	3 0 0 N	104 25 0	6 57 40	
Pylest. (Isle)	Asia	Pac. Ocean	22 23 0 S	175 41 30 W	11 42 46W	

THE LATITUDES AND LONGITUDES OF PLACES.

Q.

Names of Places.	Con.	Sea or Country.	Latitude.	Longitude. In Degrees.	Longitude. In Time.	H. W.
			° ′ ″	° ′ ″	h ′ ″	h ′
Quebec	Am.	Canada	46 47 30 N	71 10 0 W	4 44 40 W	7 30
Quimper	Eur.	France	47 58 29 N	4 6 0 W	0 16 24 W	
St. Quinton	Eur.	France	49 50 51 N	3 17 23 E	0 13 10 E	
Quiros (cape)	Asia	N. Hebrides	14 56 8 S	167 20 0 E	11 9 20 E	
Quito	Am.	Peru	0 13 17 S	77 55 0 W	5 11 40 W	

R.

Rakah (Anc.)	Asia	Mesopota.	36 1 0 N	38 50 0 E	2 35 20 E	
Ramhead	Eur.	England	50 18 40 N	4 20 15 W	0 17 21 W	
Ramsg. Wind.	Eur.	England	51 19 49 N	1 24 4 E	0 5 36 E	
Re (Isle)	Eur.	France	46 14 48 N	1 34 28 W	0 6 18 W	3 0
Recif	Am.	Brasil	8 10 0 S	35 35 0 W	2 22 20 W	
Reikian. cape	Eur.	Iceland	63 55 0 N	22 47 30 W	1 31 10 W	
Rennes	Eur.	France	48 6 45 N	1 41 53 W	0 6 48 W	
Resolut. (Bay)	Asia	Ohitahoo	9 55 30 S	139 8 40 W	9 16 35 W	2 30
Resolut. (isle)	Asia	Pac. Ocean	17 23 30 S	141 45 0 W	9 27 0 W	
Resolut. port	Asia	Tanna	19 32 25 S	169 41 5 E	11 18 44 E	
Rheims	Eur.	France	49 15 16 N	4 1 48 E	0 16 7 E	
Rhodes	Eur.	France	44 20 59 N	2 34 17 E	0 10 17 E	
Rhodes	Asia	Archipelag.	35 27 0 N	28 45 0 E	1 55 0 E	
Rimini	Eur.	Italy	44 3 43 N	12 34 15 E	0 50 17 E	
Rio Janeiro	Am.	Brasil	22 54 10 S	42 43 45 W	2 50 55 W	
Rochelle	Eur.	France	46 9 21 N	1 9 55 W	0 4 40 W	3 45
Rochford	Eur.	France	45 50 10 N	0 57 49 W	0 3 51 W	4 15
Rock of Lisb.	Eur.	Portugal	38 45 30 N	9 35 30 W	0 38 22 W	
Rodrig. (isle)	Afr.	Ind. Ocean	19 40 40 S	63 10 0 E	4 12 40 E	
Rome (St. Pet.)	Eur.	Italy	41 53 54 N	12 29 15 E	0 49 57 E	
Rotterdam	Eur.	Holland	51 55 58 N	4 29 0 E	0 17 56 E	3 0
Rotterd. (isle)	Asia	Pac. Ocean	20 16 30 S	174 30 30 W	11 38 2 W	
Rouen	Eur.	France	49 26 27 N	1 1 32 W	0 4 6 W	1 15

S.

Saba (Isle)	Am.	Carib. Sea	17 39 30 N	63 17 15 W	4 13 9 W	
Sable (Cape)	Am.	NovaScotia	43 23 45 N	65 39 15 W	4 22 37 W	
Sagan	Eur.	Silesia	51 42 12 N	15 22 15 E	1 1 29 E	
Saintes	Eur.	France	45 44 43 N	0 38 54 W	0 2 36 W	
Sainte-Croix	Eur.	France	48 0 35 N	7 23 55 E	0 29 36 E	
Salisbury Sp.	Eur.	England	51 3 49 N	1 47 0 W	0 7 8 W	
Sall (Isle)	Afr.	Atl. Ocean	16 38 15 N	22 56 15 W	1 31 45 W	
Salonique	Eur.	Turkey	40 41 10 N	23 8 0 E	1 32 32 E	
Salvages isles	Afr.	Atl. Ocean	30 0 0 N	15 54 0 W	1 3 3	

THE LATITUDE AND LONGITUDE OF PLACES.

Names of Places.	Con.	Sea or Country.	Latitude.			Longitude. In Degrees.			Longitude. In Time.			H.W.	
			°	′	″	°	′	″	h	′	″	h	′
Samana	Am.	Hispaniola	19	15	0 N	69	16	30 W	4	37	6W		
Samos	Asia	Archipel.	37	46	0 N	27	13	0 E	1	48	52 E		
Sancta Cruz	Afr.	Teneriffe	28	27	30 N	16	16	15 W	1	5	5W		
Sandw. (Bay)	Am.	S. Georgia	54	42	0 S	36	12	0 W	2	24	48W		
Sandw. (cape)	Asia	Mallicola	16	28	0 S	167	59	0 E	11	11	56 E		
Sandw. Harb.	Asia	Mallicola	16	25	20 S	167	53	0 E	11	11	32 E		
Sandw. (isle)	Asia	Pac. Ocean	17	41	0 S	168	33	0 E	11	14	12 E		
Saund. (cape)	Am.	Sand. Land	54	6	30 S	36	57	30 W	2	27	50W		
Saund. (isle)	Am.	S. Georgia	58	0	0 S	26	58	0 W	1	47	52W		
Savage (isle)	Asia	Pac. Ocean	19	2	15 S	169	30	30 W	11	18	2W		
Scarbor. Head	Eur.	England	54	18	0 N	0	13	0 W	0	0	52W		
Schweaingen	Eur.	Germany	49	23	4 N	8	40	45 E	0	34	23 E		
Scilly Isles L.	Eur.	Eng. Chan.	49	56	0 N	6	46	0 W	0	27	4W		
Sebast. St. cape	Afr.	Madagascan	12	30	0 S	46	25	0 E	3	5	40 E		
Sedan	Eur.	France	49	42	29 N	4	57	36 E	0	19	50 E		
Seez	Eur.	France	48	36	23 N	0	10	44 E	0	0	43 E		
Senegal	Afr.	Negroland	15	53	0 N	16	31	30 W	1	6	6W	10	30
Senlis	Eur.	France	49	12	28 N	2	34	58 E	0	10	20 E		
Sens	Eur.	France	48	11	55 N	3	17	21 E	0	13	6 E		
Senones	Eur.	France	48	23	7 N	6	57	0 E	0	27	48 E		
Sheerness	Eur.	England	51	25	0 N	0	50	0 E	0	3	20 E		
Sheph. isles	Asia	Pac. Ocean	16	58	0 S	168	42	0 E	11	14	48 E		
Shirburn Cast.	Eur.	England	51	39	25 N	1	0	0 W	0	4	0W		
Siam	Asia	India	14	20	40 N	100	50	0 E	6	43	20 E		
Si-ngham-fu	Asia	China	34	16	30 N	108	43	45 E	7	14	55 E		
Sisteron	Eur.	France	44	11	51 N	5	56	18 E	0	23	45 E		
Sligo Bay	Eur.	Ireland	54	15	0 N	9	18	0 W	0	37	12W		
Smyrna	Asia	Natolia	38	28	7 N	27	6	35 E	1	48	26 E		
Snæsell Mount	Eur.	Iceland	64	52	20 N	23	54	0 W	1	35	36W		
Soissons	Eur.	France	49	22	52 N	3	19	16 E	0	13	17 E		
Sombavera isl.	Am.	Carib. Sea	18	38	0 N	63	37	30 W	4	14	30W		
Soolo	Asia	India	5	57	0 N	121	15	30 E	8	5	2 E		
Southam. Sp.,	Eur.	England	50	93	59 N	1	23	56 W	0	5	36W		
Southern Th.	Am.	Sand. Land	59	34	0 S	27	45	0 W	1	51	0W		
Speaker Bank	Asia	Ind. Ocean	4	45	0 S	72	57	0 E	4	51	48 E		
Stalbridge	Eur.	England	50	57	0 N	2	23	30 W	0	9	34W		
Start-Point	Eur.	England	50	13	26 N	3	38	21 W	0	14	33W		
Stockholm	Eur.	Sweden	59	20	31 N	18	3	55 E	1	12	16 E		
Stonehenge	Eur.	England	51	10	44 N	1	49	8 W	0	7	16W		
Straumness	Eur.	Iceland	65	39	40 N	24	29	15 W	1	37	57W		
Stratsbourgh	Eur.	France	48	34	56 N	7	44	36 E	0	30	58 E		
Success Bay	Am.	Ter. del F.	54	49	45 S	65	25	0 W	4	21	40W		
Success Cape	Am.	Ter. del F.	55	1	0 S	65	27	0 W	4	21	48W		
Suez	Afr.	Egypt	29	50	0 N	33	27	0 E	2	13	48E		
Sultz	Eur.	France	47	53	10 N	7	14	32 W	0	28	58W		
Surat	Asia	India	21	10	0 N	72	22	30 E	4	49	30 E		

THE LATITUDES AND LONGITUDES OF PLACES.

T.

Names of Places.	Con.	Sea or Country.	Latitude.	Longitude. In Degrees.	Longitude. In Time.	H.W
			° ′ ″	° ′ ″	h ′ ″	h ′
Table Island	Asia	N. Hebrides	15 38 0 S	167 7 0 E	11 8 28 E.	
Tanna	Asia	Pac. Ocean	19 32 25 S	169 41 5 E	11 18 44 E	3 0
Taoukaa(isle)	Asia	Pac. Ocean	14 30 30 S	145 9 30 W	9 40 38W	
Tarascon	Eur.	France	43 48 20 N	4 39 36 E	0 18 38 E	
Tarbes	Eur.	France	43 13 52 N	0 3 59 E	0 0 16 E	
Tassacorta	Afr.	Isle Palma	28 38 0 N	17 58 0 W	1 11 52W	
Temomtengis	Asia	Soloo	5 57 0 N	120 53 30 E	8 3 34 E	
Tener. (Peak)	Afr.	Canaries	28 17 0 N	16 40 0 W	1 6 40W	
Tercera	Eur.	Azores	38 45 0 N	27 6 0 W	1 48 24W	
Texel Isle	Eur.	Holland	53 10 0 N	4 59 0 E	0 19 56 E	
Thionville	Eur.	France	49 21 30 N	6 10 30 E	0 24 42 E	
Tho. St. (isle)	Am	Virgin Isles	18 21 55 N	64 51 30 W	4 19 26W	
Thule(South.)	Am.	Sand. Land	59 34 0 S	27 45 0 W	1 51 0W	
Thury	Eur	France	49 21 28 N	2 18 30 E	0 9 14 E	
Tim.(S.W.P.)	Asia	India	10 23 0 S	123 59 0 E	8 15 56 E	
Tim. L.(S.P.)	Asia	India	8 15 0 S	131 54 0 E	8 47 36 E	
Tobolski	Asia	iberia	58 12 30 N	68 25 0 E	4 33 40 E	
Tolaga Bay	Asia	N. Zealand	38 21 30 S	178 33 45 E	11 58 15 E	
Toledo	Eur.	Spain	39 50 0 N	3 20 0 W	0 13 20W	
Tomsk	Asia	Siberia	56 30 0 N	84 59 30 E	5 39 58 E	
TongaT.(isle)	Asia	Pac. Ocean	21 9 0 S	174 46 0 W	11 39 4W	
Tonnerre	Eur.	France	47 51 8 N	3 58 44 E	0 15 59 E	
Torbay	Eur.	England	50 34 0 N	3 36 0 W	0 14 24W	
Tornea	Eur.	Sweden	65 50 50 N	24 12 0 E	1 36 48 E	
Toulon	Eur.	France	43 7 16 N	5 55 26 E	0 23 42 E	
Toulouse	Eur.	France	43 35 46 N	1 26 21 E	0 5 45 E	
Tournan	Eur.	France	48 43 57 N	2 45 15 E	0 11 1 E	
Tours	Eur.	France	47 23 46 N	0 41 32 E	0 2 46 E	
Traitor's Head	Asia	Erramanga	18 43 30 S	169 20 30 E	11 17 22 E	
Trieste	Eur.	AdriaticSea	45 51. 0 N	14 3 0 E	0 56 12 E	
Trinidad	Am.	Atl. Ocean	20 15 0 S	126 42 0 W	8 26 48W	
Tripoli	Afr.	Barbary	32 53 40 N	13 5 15 E	0 52 21 E	
Troyes	Eur.	France	48 18 5 N	4 4 34 E	0 16 18 E	
Turin	Eur.	Italy	45 4 14 N	7 40 0 E	0 30 40 E	
Turna. (cape)	Asia	N. Zealand	40 28 0 S	176 56 0 E	11 47 44 E	
Turtle Island	Asia	Pac. Ocean	19 48 45 S	177 57 0 W	11 51 48W	
Tyenaw	Eur.	Hungary	48 23 30 N	17 33 45 E	1 10 15 E	

THE LATITUDES AND LONGITUDES OF PLACES.

U.

Names of Places.	Con.	Sea or Country.	Latitude.	Longitude. In Degrees.	Longitude. In Time.	H.W.
			° ′ ″	° ′ ″	h ′ ″	h ′
Uliateah	Asia	Pac. Ocean	16 45 0 S	151 31 0 W	10 6 4W	
Upsal	Eur.	Sweden	59 51 30 N	17 38 45 E	1 10 35 E	
Uraniberg	Eur.	Denmark	55 54 38 N	12 42 44 E	0 50 51 E	
Ushant	Eur.	France	48 28 30 N	5 4 33 W	0 20 18W	4 30

V.

Valenciennes	Eur.	France	50 21 27 N	3 31 40 E	0 14 18 E	
Valery St.	Eur.	France	50 11 13 N	1 37 6 E	0 6 28 E	
Vallesy St.	Eur.	France	49 52 12 N	0 41 10 E	0 2 45 E	
Valparaiso	Am.	Chili	33 2 36 S	72 19 15 W	4 49 17W	
Van Diem. R.	Asia	TongaTabu	21 4 15 S	174 56 24 W	11 39 46W	
Vannes	Eur.	France	47 39 14 N	2 46 26 W	0 11 17W	
Vence	Eur.	France	43 43 16 N	7 7 28 E	0 28 30 E	
Venice	Eur.	Italy	45 26 7 N	12 22 45 E	0 49 31 E	
Venus (point)	Asia	Otaheite	17 29 17 S	149 35 45 W	9 58 23W	10 38
Vera Cruz	Am.	Mexico	19 9 38 N	96 0 0 W	6 24 0W	
Verd (cape)	Afr.	Negroland	14 43 45 N	17 30 45 W	1 10 3W	
Verdun	Eur.	France	49 9 24 N	5 22 41 E	0 21 31 E	
Verona	Eur.	Italy	45 26 7 N	11 18 30 E	0 45 14 E	
Versailles	Eur.	France	48 48 21 N	2 7 7 E	0 8 28 E	
Vienna (Obs.)	Eur.	Hungary	48 12 36 N	16 16 22 E	1 5 30 E	
Vigo	Eur.	Spain	42 14 24 N	8 28 0 W	0 33 52W	
Vinc.St.(cape)	Eur.	Spain	37 3 0 N	8 59 26 W	0 35 58W	
Vintimiglia	Eur.	Italy	43 53 20 N	7 37 30 E	0 30 30 E	
Virg.Gord.Ft.	Am.	W. Indies	18 18 0 N	64 0 0 W	4 16 0W	
Virgin (cape)	Am.	Patagonia	52 23 0 S	67 54 0 W	4 31 36W	
Viviers	Eur.	France	44 28 57 N	4 40 55 E	0 18 44 E	
Vurtzburg	Eur.	Franconia	49 46 6 N	10 13 45 E	0 40 55 E	

W.

Wakefield	Eur.	England	53 41 0 N	1 33 30 W	0 6 14W	
Pr. of W.'s F.	Am.	New Wales	58 47 30 N	94 7 30 W	6 16 30W	
Wanstead	Eur.	England	51 34 10 N	0 2 30 E	0 0 10 E	
Wardhus	Eur.	Lapland	70 22 36 N	31 6 45 E	2 4 27 E	
Warsaw	Eur.	Poland	52 14 28 N	21 0 0 E	1 24 2 E	
Westm.(isles)	Eur.	N. Ocean	63 20 30 N	20 27 45 W	1 21 51W	
Wexford	Eur.	Ireland	52 22 0 N	6 30 0 W	0 26 0W	
Weymouth	Eur.	England	52 40 0 N	2 34 0 W	0 9 36W	
Whitehaven	Eur.	England	54 25 0 N	3 15 0 W	0 13 0W	
Whits. (isle)	Asia	Pac. Ocean	15 44 20 S	168 20 15 E	11 13 21 E	

THE LATITUDES AND LONGITUDES OF PLACES.

Names of Places.	Con.	Sea or Country.	Latitude.	Longitude In Degrees.	Longitude In Time.	H	W.
			° ′ ″	° ′ ″	h ′ ″	h	′
William (Ft.)	Asia	Bengal	22 34 45 N	88 29 30 E	5 53 58 E		
Willis' (isles)	Am.	S. Georgia	54 0 0 S	38 29 40 W	2 33 59W		
Wilna	Eur.	Poland	54 41 0 N	25 27 30 E	1 41 50 E		
Wittenburg	Eur.	Germany	51 53 0 N	12 44 30 E	0 50 58 E		
Wologda	Eur.	Russia	59 19 0 N				
Worcester	Eur.	England	52 9 30 N	2 0 15 W	0 8 1W		
Woslak	Eur.	Russia.	61 15 0 N				
Wyke Church	Eur.	England	50 35 57 N	2 28 10 W	0 9 53W		
			Y.				
Ylo	Am.	Peru	17 36 15 S	71 13 0 W	4 44 52W		
York	Eur.	England	53 59 0 N	1 6 40 W	0 4 27W		
York (New)	Am.	N. York	40 40 0 N	74 11 0 W	4 56 44W	3	0
Yorkminster	Am.	Ter. del F.	55 26 20 S	70 8 0 W	4 40 32W		

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MODERN GEOGRAPHY.

PRELIMINARY OBSERVATIONS.

DEFINITIONS. THE word *Geography* is derived from the Greek language, and implies a description of the earth. It is sometimes contrasted with *Hydrography*, which signifies a description of the water, that is, of seas, lakes, rivers, &c., thus including marine charts: but, in general, hydrography is rather regarded as a province of geography. Both were anciently considered along with astronomy, as parts of *Cosmography*, which aspired to delineate the universe.

Geography is more justly contrasted with *Chorography*, which illustrates a country or province; and still more with *Topography*, which describes a particular place, or small district.

What is called General Geography embraces a wide view of the subject, regarding the earth astronomically as a planet, the grand divisions of land and water, the winds, tides, meteorology, &c.; and may extend to what is called the mechanical part of geography, in directions for the construction of globes, maps, and charts.

Among the other divisions of this science may be named Sacred Geography, solely employed in the illustration of the Scriptures; Ecclesiastic Geography, which describes the government of the Church, as divided into patriarchates, archbishopricks, bishopricks, archdeaneries, &c., with their respective boundaries, often varying much from those of the secular provinces; and Physical Geography, or Geology, which investigates the interior of the earth, so far only as real discoveries can be made; for what have been styled systems of the earth, which have consumed the labours of many ingenious men, have no connection with the solid science of geology, but ought rather to be styled cosmogonies, or ideal creations of planets.

But Geography, popularly considered, is occupied in the description of the various regions of this globe, chiefly as being divided among various nations, and improved by human art and industry. If a scien-

tific term were indispensable for this popular acceptation, that of Historical Geography might be adopted, not only from its professed subservience to history, but because it is in fact a narrative so nearly approaching the historical, that Herodotus, and many other ancient historians, have diversified their works with large portions of geography, and the celebrated description of Germany by Tacitus, contains most of the materials adopted in modern treatises of geography.

Divisions of Geography. In this popular point of view, historical geography admits of three divisions. 1. The Ancient or Classical, which describes the state of the earth, so far as it was discovered at different periods, but not extending further than the year of Christ 500. 2. That of the Middle Ages, which reaches to the fifteenth century, when the discoveries of the Portuguese began to lay wider foundations of the science. 3. Modern Geography, the sole subject of the present work, which, while it embraces the most recent discoveries, still remains capable of great accessions, particularly in Africa; not to mention more minute deficiencies.

The chief object of modern geography is to present the most recent and authentic information concerning the numerous nations and states who divide and diversify the earth; but on this subject it is impossible to attain accurate ideas without a brief introductory view of the progress of each nation and state. Though, in some few instances, natural barriers have divided, and continue to divide nations, yet in general the boundaries are arbitrary, so that the natural geography of a country, though forming an essential feature, hitherto treated with too much neglect in geographical works, cannot be admitted to a predominance; but on the contrary, as matter yields to mind, may rather be regarded as a sequel in historical geography, which is chiefly occupied in describing the diversities of nations, and the conditions of the various races of mankind. On this subject there is no doubt room for a variety of opinions; but after long consideration it has appeared most eligible to prefer the following order:

Order of topics. 1. The historical, or progressive geography of each country. 2. Its political state, including most of the topics which recent German writers, by a term of dubious purity, call statistic. 3. The civil geography, including objects not so immediately connected with the government, as an account of the chief cities, towns, &c. 4. The natural geography.*

Quarters of the world. The ancients considered the earth under the three grand divisions of Asia, Europe, and Africa; yet, as they all form one continent, the distinctions were arbitrary, as they often included Egypt under Asia, and they had not discovered the limits of Europe towards the N. E. Modern discoveries have added a fourth division, that of America; which, exceeding even Asia in size, might perhaps as well have been admitted under two grand and distinct denominations, limited by the isthmus of Darien. It was supposed, till within these thirty years, that there existed a vast continent in the south of the globe, and many schemes were formed for

* This arrangement was in part suggested by the *Essai sur l'Histoire de Geographie* by Robert de Vaugondy.

colonizing the wide and opulent *Terra Australis;* but the second navigation of the immortal Cook dispelled this visionary land from geography, or demonstrated, that if any continent there existed, it must be lost in the uninhabitable ice of the south pole. Yet the wide extent of New Holland rewarded the views of enterprise. Too large for an island, too small for a continent, New Holland, like the other works of nature, eludes the petty distinctions of man; and while geographers hesitate whether to ascribe it to Asia, or, with De Brosses, to denominate it a FIFTH specific division of the earth, it is not improbable that the popular division of four quarters of the world will continue to predominate over any scientific discussion.*

Of the grand divisions of the earth, Asia has ever been the most populous, and is supposed to contain about 500,000,000 of souls, if China, as recently averred, comprize 330,000,000. The population of Africa may be 30,000,000, of America 20,000,000: and 150,000,000 may be assigned to Europe.†

FACE OF THE GLOBE. Recent discoveries have evinced that more than two-thirds of this globe are covered with water; and these waters, whether oceans, seas, lakes, or rivers, are contained in hollow spaces, more or less large, which late French geographers have styled *bassins*, or basons, by a term of little dignity. They may as well be called Concavities; while, on the other hand, the chief Convexities or Protuberances of the globe, by the French styled *plateaux*, consist of elevated uplands, sometimes crowned by mountains, sometimes rather level, as in the extensive central protuberance of Asia. In either case, long chains of mountains commonly proceed from those chief convexities, in various directions; and the principal rivers usually spring from the most elevated grounds. Though the low and fertile plains, generally perceivable for a long space before rivers enter the sea, be often deposited by their waters, as in the Delta, and other instances, yet the geologist would in vain attempt general rules; while, as on a small scale, deep glens are found without any rivulet, so on a large, vast and extensive hollows will appear, without the smallest trace of their having been pervaded by a river.

OCEANS. The grandest concavity of this globe is filled by the Pacific Ocean, occupying nearly half of its surface, from the eastern shores of New Holland to the western coast of America; and diversified with several groups of islands, which seem as it were the summits of vast mountains emerging from the waves. This chief concavity, separately considered, receives but few rivers, the chief being the

* The word *quarter*, as denoting a fourth part, becomes rather a solecism, when applied to the four grand divisions of the earth: it may be accepted in a second sense, equally popular in French and English, (whence derived?) which signifies a particular region, or station: yet a fifth or sixth *quarter* of the world would not please the ear. The *Magellanica* of Cluverius and De Brosses has faded before the light of recent discoveries; but the *Australasia* and *Polynesia* of the latter are excellent and clear arrangements, now justly adopted by most men of science.

† Australasia and Polynesia, or New Holland and the Isles in the Pacific, probably do not contain above half a million.

Amur from Tartary, and the Hoan Ho and Kian Ku from China, while the principal rivers of America run towards the east.

The next grand concavity is that of the Atlantic Ocean, between the ancient continent and the new. A third is the Indian Ocean.

The seas between the Arctic and Antarctic circles and the poles, have been styled the Arctic and Antarctic Oceans; the latter having supplanted the Terra Australis, and being in fact only a continuation of the Pacific, Atlantic, and Indian Oceans; while the Arctic Sea is partly embraced by continents, and receives many important rivers.

Such are the most profound concavities of the globe, while others are filled by more minute seas, as the Mediterranean, the Baltic, and others of yet smaller extent, till we descend to inland lakes of fresh water.

Rivers. Oblong concavities, sometimes of great length, mark the courses of the rivers; which, generally, at first intersect the higher grounds, till the declivity become more gentle, on their approach towards their inferior receptacles. But as general views are seldom precise, it must not be forgotten, as already in part observed, that even large rivers sometimes spring from lowland marshes, and wind through vast plains, unaccompanied by any concavity, except that of their immediate course; while, on the other hand, extensive vales, and low hollow spaces, frequently occur, destitute of any stream. Rivers will also sometimes force a passage, where nature has erected mountains and rocks against it; and where the *bassin* of the French would appear to be in another direction, which the river might have gained with more ease; so estranged is nature from human theory. In like manner, though the chief chains of mountains in Europe extend in a south-easterly and north-westerly direction, yet there are so many exceptions, and such numerous and important variations in other parts of the globe, that theory in vain attempts to generalize. As mountains may be found in every direction of the compass, so a river may rise from an inland lake or marsh, and force its way through rocky barriers of great elevation. In short, the theory of the French geographers, though just in general, must not be too widely accepted: and the book of nature must be regarded as the chief code of consultation.

Continents. From the vast expanse of oceanic waters, arises in the ancient hemisphere, that wide continent, which contains Asia, Europe, and Africa; and in the modern hemisphere the continent of America, now discovered to form, as it were, a separate island, divided by a strait of the sea from the ancient continent. In the latter many discoveries, of the utmost importance to geography, are of very modern date, and it is not above sixty years since we obtained an imperfect idea of the extent of Siberia, and the Russian empire: nor above twenty since ample, real, and accurate knowledge of these wide regions began to be diffused. So that in fact America may be said to have been discovered before Asia: and of Africa our knowledge continues imperfect, while the newest observations, instead of diminishing, rather increase our ideas of its extent.

But the grandest division of the ancient continent is Asia, the parent of nations, and of civilization; on the north-east, and south, surrounded by the ocean; but on the west divided by an ideal line from Africa; and from Europe by boundaries not very strongly impressed by the hand of nature. The Russian and the Turkish empires, extending over large portions of both continents, intimately connect Asia with Europe. But for the sake of clearness and precision, the chief merits of any work of science, geographers retain the strict division of the ancient continent into three great parts, sacrificing a more minute, to a more important distinction; which, if not strictly natural, is ethical, as the manners of the Asiatic subjects of Russia, and even of Turkey, differ considerably from those of the European inhabitants of those empires.

As Europe is the seat of letters and arts, and the greatest exertions of human energy in every department; and is besides the native region of the chief modern geographers, and that in which the readers are most intimately and deeply interested, it is always the division first treated; though the order be arbitrary, and Ptolemy, who has been styled the father of geography, begins indeed with Europe, but describes Africa before Asia.* Before proceeding more minutely to consider the several kingdoms and states, comprised in this great division of the globe, it will be proper, in compliance with an usual and unobjectionable form, to offer a brief and general description of this distinguished portion of the earth.

* The best edition of his maps, Amst. 1730, places Africa first.

EUROPE.

EXTENT. THIS part of the globe is the smallest in extent, yielding considerably even to Africa. From the Portuguese Cape, styled by our mariners the Rock of Lisbon, in the west, to the Uralian mountains in the east, the length may be about 3,300 British miles; and the breadth from Cape Nord, in Danish Lapland, to Cape Matapan, the southern extremity of Greece, may be about 2,350. The contents in square miles have been estimated with such diversity of opinion, such estimates being, in truth, arbitrary and only comparative, that it is sufficient to mention the medial number of about two millions and a half.

LIMITS. The ancients had no just ideas of the boundaries of Europe, the name itself having seemingly originated from a small district near the Hellespont, as the distinctive name of Asia also spread from the opposite shore. More than a third part of Europe, towards the north and east, has only been known with precision in modern times. On the south it is limited by the Mediterranean sea; on the west by the Atlantic, which contains the furthest European isle, that of Iceland, Greenland being regarded as a part of North America. On the north the boundary is the Arctic Ocean, embracing the remote isles of Spitzbergen, and Novaya Zemlia, or the New Land. Toward the east the boundaries admit of some discussion. The Uralian mountains, a grand natural limit, not extending to the Arctic Ocean, the river Cara, which flows into the sea of Karskoye, is admitted as a boundary. The Uralian limit extends to about 56 degrees of north latitude: to the south of which the grand confines of Europe and Asia have been sought in the petty distinctions of Russian governments. More natural limits might be obtained by tracing the river Oufa, from its source, to its junction with the Belaia. Thence along the Kama to the Volga, which would constitute a striking natural division, to the town of Sarepta; whence a short ideal line, the only one admitted in this delineation, will lead due west to the river Don, which would complete the unascertained boundary; that on the north and west of the Euxine being clear and precise.

ANCIENT POPULATION. The ancient population of Europe consisted of the Celts in the west and south; the Fins in the north-east; and the Laps or Laplanders, a diminutive race like the Samoieds of Asia, in the furthest north, and who seem to have enriched their

original rude language by adopting, in a great measure, that of their more civilized neighbours the Fins. Those ancient inhabitants, who seem to have been thinly scattered, were driven towards the west and north by the Scythians or Goths from Asia, whose descendants occupy the greater part of Europe; by the Sarmatians, or Slavonic tribes, also from Asia, the ancestors of the Russians, Poles, &c.; and who were accompanied by the Heruli, using what is now called the Lettic speech, to be found in Prussia, Lithuania, Samogitia, Courland, and Livonia, being a-kin to the Slavonic language,* yet with many shades of distinction. From Africa, the colony of Iberi, northern Mauretani, passed into Spain at a very early period. The later accession of Hungarians and Turks from Asia, may likewise be commemorated.

PROGRESSIVE GEOGRAPHY. The progressive geography of Europe will be more aptly illustrated in the descriptions of each kingdom and state. Suffice it here to observe, that the ablest modern geographers, not excepting D'Anville himself, have greatly erred in their views of the ancient knowledge of Europe. Of Scandinavia the ancients only knew the southern part, as far as the large lakes of Weter and Wener. The Roman ships explored the southern shores of the Baltic as far as the river Rubo, or the western Dwina, and discovered the names of several tribes along the shores: but of the central parts of Germany it is evident, from the maps of Ptolemy, that they had no just ideas; so that the tribes which he enumerates may be more justly assigned to the northern parts along the Baltic, or to the southern on the left of the Danube. The Carpathian or Sarmatian mountains were well known, but the line of 50° or 52° of north latitude, must confine the ancient knowledge in the north-east. A singularity in the ancient descriptions has often misled; for as the mountains, in the savage state of Europe, were crowned or accompanied with forests, the same term was used in several barbarous languages to express either; so that the ancients often place important mountains, where the hand of nature had only planted large forests. This remark becomes essential in the comparison of ancient and modern geography. The Riphæan mountains are vainly supposed to have been the Uralian chain, which were to the ancients hid in the profoundest darkness, instead of a large forest running from east to west. The Sevo Mons of Pliny, which he positively assigns to the north of Germany, though geographers in direct opposition to his text, transfer it to Norway, a region almost as unknown to the ancients as America, must be regarded as a vast forest, extending to some promontory: and the Venedici Montes of Ptolemy are in the like predicament; for modern knowledge evinces that no such mountains exist. Of all sciences, perhaps geography has made the most slow and imperfect progress, and the first restorers of it place at random many grand features of nature, instead of pursuing the recent and just plan, of giving an exact delineation of the country, and afterwards exploring the real extent of ancient knowledge.

RELIGION. The christian religion prevails throughout Europe, except in Turkey, where however at least one half of the inhabitants

* Tooke's View of Russia, i. 455.

are attached to the Greek church. Wherever the christian faith has penetrated, knowledge, industry, and civilization have followed: among the barbarous tribes in the north the progress was unhappily slow; Scandinavia remaining pagan till the eleventh century, and some Slavonic tribes on the south of the Baltic till the thirteenth: nay it is not above a century ago, since the Laplanders were converted by missions from Denmark. The two grand distinctions are catholics and protestants, the former in the south, where the passions are more warm, and the imagination more delighted with splendor: the latter in the north, where the satisfaction of the judgment predominates.

This universality of the christian religion has been followed by another superlative advantage, that of constituting all Europe, as it were, into one republic, so that any useful discovery made in one state passes to the rest with celerity. In this respect Europe has been compared to ancient Greece; and it is to be hoped that Russia will not prove another Macedon.

CLIMATE. This fair portion of the globe is chiefly situated in the temperate zone, if such distinctions have not vanished from geography, since modern discoveries have evinced that the climate often depends on local causes; that the Alps in a southern latitude present mountains of ice unknown in Lapland; that the torrid zone abounds with water and habitations, and may perhaps contain mountains covered with snow. Yet freedom from the excessive heats of Asia and Africa has contributed to the vigour of the frame, and the energy of the mind.

INLAND SEAS. In a general view of Europe, one of the most striking and interesting features is the number and extent of the inland seas, justly regarded as chief causes of the extensive industry and civilization, and consequent superiority to the other grand divisions of the globe. Had Africa been intersected by a large inland sea from the west, it is probable that the blessings of industry would have been widely spread. Among inland seas the Mediterranean is justly pre-eminent, having been the centre of civilization to ancient and modern Europe. The columns of Hercules marked its western boundary, being the mountain or rock of Abyla, now called Ceuta, and Kalpe in Spain, the Gibraltar of modern fame. The length of the Mediterranean is about 2000 miles to its farthest extremity in Syria; but in ancient maps the length has been extended to about 2500 miles. On its northern side open two immense gulfs, that of Venice, and the Archipelago; the former being the Adriatic, the latter the Egean sea, of the ancients. From this last a strait, called the Hellespont, conducts to the sea of Marmora the classical Propontis: and another now styled the strait of Constantinople, the ancient Thracian Bosphorus, leads to the Euxine, or Black Sea; which, to the north, presents the shallow Palus Mæotis, or sea of Azof, the utmost maritime limit of Europe in that quarter. This wide expanse of the Mediterranean is beautifully sprinkled with islands, and environed with opulent coasts, abounding with the most sublime and picturesque features of nature: tides are not perceivable, except in the narrowest straits; but according to physiologists there is a current along the Italian shore, from the west to the east, and towards the African coast in an opposite

direction. In the Adriatic the current runs north-west along Dalmatia, and returns by the opposite shore of Italy. The Mediterranean abounds with fish, many of which are little known in more northern latitudes. The chief fisheries are those of the tunny, of the sword fish, and of the sea dog, a species of shark, and of the diminutive anchovy. It is also the chief seminary of coral, now known to be the work of marine insects. This supposed plant is of three colours, the red, the vermilion, and the white; and its greatest height is about eleven inches. It is equally hard in the sea, and in the air; and is generally brought up by a kind of net from the depth of 60 to 125 feet.* To enumerate and ascertain shoals and rocks is the office of the hydrographer; but fishing banks are of general importance, and some are found near Sicily. The Black sea is said to derive its name from its black rocks, or dangerous navigation: but it is difficult to account for such terms, often derived from the fertile and superstitious fancy of mariners. The sea of Azof is polluted with mud, whence it was styled Paulus, or a marsh, by the ancients: it is united to the Euxine by the strait of Caffa, the ancient Cimmerian Bosphorus.

The second grand inland sea of Europe is the Baltic, by the Germans called the Eastern Sea; whence the Easterlings of English history, people from the shores of the Baltic. This extensive inlet opens from the German sea, by a gulf pointing N. E. called the Skager Rack; and afterwards passes south, in what is called the Cattegat, to the S. E. of which is the Sound of Elsineur, a strait where vessels pay a tribute of courtesy to Denmark. The Baltic afterwards spreads widely to the N. E. and is divided into two extensive branches, called the gulfs of Bothnia and Finland, both covered or impeded with ice for four or five months of the northern winter. Ancient historians even report that wolves have passed on the ice from Norway to Jutland; and if veracious, the rigour of the seasons must have greatly abated. The greatest depth of this sea is said not to exceed fifty fathoms. Swedish physiologists pronounce that it loses about four feet in extent in the course of a century; and that the water does not contain above one thirtieth part of salt, whereas other sea water often holds a tenth: this freshness they impute to the quantity of ice; and they also assert, that when the north wind blows, the waters become so fresh, that they may even be employed for domestic uses. Tides are unknown, and the fish are few.

The third and last inland sea of Europe is that called the White Sea, in the north of Russia, more known in Europe, and particularly to English enterprize, before the commerce of Archangel was supplanted by that of Petersburg. To Octer, in the reign of the great Alfred, it was known by the name of the Qven Sea; and the Icelandic writers styled it the sea of Ganviik, on the shore of which was their Biarmia. The White Sea contains a number of small islands; but the accounts yet given have been brief and unsatisfactory.

OTHER SEAS. Among the other maritime divisions may be named the German sea, so called because it waters the western shores of ancient Germany, from the Rhine to the extremity of Jutland. It

* Spallanzani's Trav. in the Two Sicilies, iv. 317.

is now often styled, with sufficient impropriety, the North Sea, a term probably adopted by us from the Dutch. It may be regarded as a part of the Atlantic ocean, terminating at the straits of Dover; whence the British Channel extends to the west. The bay of Biscay is another large inlet of the Atlantic. The Bristol Channel is rather the estuary, or wide frith, of the Severn. Between Great Britain and Ireland are St. George's Channel on the south; the Irish sea in the centre, which leads to the North Channel. That part of the Atlantic which passes between Scotland and the extreme range of the western isles, from Barra to Leuis, has received no distinct appellation, though it might be aptly styled the Hebudian Channel. To the North of Scotland is the Deucaledonian sea of the ancients; which being considered as extending into and through the Baltic, was also styled the Sarmatian.

Arctic Ocean. To the north of Europe is the Arctic ocean, the dismal and solitary reservoir of myriads of miles of ice, the very skirts of which, floating in enormous mountains, crowned with brilliant pinnacles of every hue, delight the eye and appal the heart of the mariner. Yet this enormous waste is, in the hand of Providence, a fertile field of provisions for the human race. Here the vast battalions of herrings seem to seek a refuge from numerous foes, and to breed their millions in security. About the middle of winter, emerging from their retreat, they spread in two divisions, one towards the west, which covers the shores of America, as far as the Chesapeak and Carolina; while a third more minute squadron passes the strait between Asia and America, and visits the coast of Kamschatka*. The most memorable division reaches Iceland about the beginning of March, in a close phalanx of surprising depth, and such extent, that the surface is supposed to equal the dimensions of Great Britain and Ireland. They are however subdivided into numberless columns of five or six miles in length, and three or four in breadth, followed by numerous sea fowl, and perceivable by the rippling of the water, and a brilliant reflection like that of a rainbow. In April or May the vanguard of those allotted to the British dominions reaches Shetland, and the grand body arrives in June; towards the end of which month, and through that of July, they are in the greatest perfection, a circumstance well known to the Dutch fishers, who then caught that superior sort which formed the grand source of the wealth of the United Provinces. From Shetland one division proceeds towards the east, as far as Yarmouth, where they appear in October. The other brigade passes to the west, along both shores of Ireland. A few stragglers are found at irregular periods, having proceeded beyond their powers of return; but it is generally credited, that millions regain the Arctic Ocean, and deposite their spawn about the month of October.

To enumerate the smaller gulfs, the straits, and other minute diversities of the seas, either in a feeble series of names, or in a dry arithmetical table, would be superfluous, as they are best studied in the maps, and as that mode of communicating science is perhaps of all others the most uncouth and repulsive. As well might history be studied by the barren repetition of an hundred names of statesmen and

* Pennant Arctic Zool. i. ccxi.

warriors. But this account of the European seas must not be closed without a few brief hints on a subject generally neglected in works of this nature, the large Banks, or comparative shoals, supposed to be ridges of submarine mountains, and which being frequently the resort of cod and other fish, invite the attention of national industry. The Goodwin sands, off the coast of Kent, are rather dangerous to the mariner, than inviting to the fisher; but on the coast of Holland there are many banks which supply excellent fish, as turbot, soal, plaice, &c. Further to the north is the extensive Dogger bank, stretching south-east and north-west; beginning about twelve leagues from Flamborough head, and extending near 72 leagues towards the coast of Jutland. Between the Dogger and the Well Bank, to the south, are the silverpits of the mariners, which supply London with cod, a fish which loves the deep water near the banks, while the flat fish delight in the shallows. Near the Dogger Bank was fought the noted engagement with the Dutch in 1781. The Ore and the Lemon lie between these banks and the British shores. To the north-east of the Dogger Bank is the Horn-riff, a narrow strip extending to Jutland: the Jutts-riff is a sand-bank stretching, like a crescent, from the mouth of the Baltic into the German Sea. SAND BANKS.

The Mar Bank begins opposite to Berwick, but is only about fifteen miles in length. Further to the east extends the Long Fortys, of great extent, from Buchan Ness to Newcastle; and from forty to one hundred miles distant from the shore. From the coast of Buchan a bank also reaches across the German sea towards the Jutts-riff. What are called the Montrose Pits, as being in the latitude of that town, though to the east of the Long Fortys, are hollows, from three to four miles in diameter, from seventy to one hundred fathom deep, with a soft muddy bottom, in a bank of gravel about fifty miles long, under forty fathoms of water.

In the open Atlantic the largest bank is that of Newfoundland, reserved for the description of the American seas; but there is a considerable bank to the west of the Hebrides, abounding with cod and other fish.

RIVERS AND MOUNTAINS. The chief rivers of Europe are described under the respective countries through which they flow. Of the vast Wolga, far the greater part is included in Europe: the Danube is the next in fame; and is followed by the Dnieper, or Nieper; the Rhine, and the Elbe. The most elevated mountains are the Alps, which are followed by the Pyrenees, and the extensive ridge which divides Norway from Sweden. The Carpathian mountains, and the chain of Emineh, or Hæmus, are, with the Apennines, of inferior extent and height. In the particular descriptions these grand and immoveable features of nature, which unaccountably have only attracted due attention within these few years, will be found to be illustrated as far as the materials would permit.

GOVERNMENTS. The kingdoms and states of Europe, may be considered, 1. As despotic monarchies, as those of Russia and Turkey; 2. Absolute monarchies, as Spain, Denmark, &c. or, 3. Limited monarchies, as the Empire of Germany, kingdom of Great Britain, &c. Since the fall of Venice, and the subversion of Switzerland and Holland,

scarcely an example occurs of permanent and fixed aristocracy, or the hereditary governments of nobles. Of democracy, or more strictly speaking, elective aristocracy, a few cities, and some Swiss cantons, may preserve a semblance; while France at the present *hour* is a military despotism, under the name of a democratical republic.

ARRANGEMENT. According to the plan of this work, already explained in the preface, the various states of Europe will be arranged in three divisions, considering them according to their real consequence, as of the first, second, or third order; and each will be treated at a length proportioned to its weight in the political scale, and the consequent interest which it inspires. A small state may indeed sometimes excite a more just curiosity than one of larger dimensions; but such considerations are foreign to an exact system of Geography, detailed in a precise order of topics, and extended with impartial views over the whole circle of human affairs. Foreigners may object that too much space is allotted to the British dominions; but the same objection might extend to every system ancient and modern, as the authors have always enlarged the description of the countries in which they wrote. His native country ought also to be the chief subject of every reader; nor can much useful knowledge, (for our knowledge chiefly springs from comparison,) be instituted concerning foreign regions, till after we have formed an intimate acquaintance with our native land. It will also be understood that, though no point of science be more simple or clear than the arrangement of states, according to their separate orders, at a given period, yet it would be alike idle and presumptuous to decide the precise rank of a state in each order; for instance, whether France or Russia be the most powerful. This part of the arrangement must therefore be elective; and it is sufficient that the states of the same order be treated with a similar length of description.

At the beginning of the nineteenth century, the European states comprised in the first order are: 1. The united kingdoms of Great Britain and Ireland: 2. France: 3. Russia: 4. The Austrian dominions: 5. Those of Prussia: 6. Spain: 7. Turkey: which last cannot so justly be reduced to the second order; for though perhaps approaching its fall, still it boasts the name and weight of an empire.

Under the second order have been arranged: 1. Holland, or the United Provinces: 2. Denmark: 3. Sweden: 4. Portugal: 5. Switzerland. In the third are considered the chief states of Germany, that labyrinth of geography, and those of Italy. The kingdoms of Sicily and Sardinia might perhaps, if entire and unshaken, aspire to the second order; and an equal station might be claimed by the junctive Electorate Palatine and Bavarian, and by that of Saxony. But as such states only form rather superior divisions of Germany and Italy, it appeared more adviseable to consider them in their natural intimate connexion with these countries.

This explanation being premised, the first description shall be that of the British dominions.

ENGLAND.

CHAPTER I.

HISTORICAL OR PROGRESSIVE GEOGRAPHY.

NAMES.—EXTENT.—ORIGINAL POPULATION.—ROMAN,—SAXON,—AND NORMAN GEOGRAPHY.—HISTORICAL EPOCHS, AND ANTIQUITIES.

NAMES. THE Phœnicians, the most ancient, enlightened navigators, are generally allowed to have been the first discoverers of the British Islands, and to have transmitted their fame on the page of recorded knowledge. Bochart even supposes that the name of *Britain* originates from a Phœnician word; and another learned writer justly infers, that the name of *Cassiterides*, afterwards restricted to the isles of Scilly, was at first extended to Great Britain and Ireland*. This name implies in the Greek language the islands of *tin;* and was probably translated from some corresponding Phœnician term. However this be, the appellations of *Albion* and *Britannia* are afterwards commemorated in Grecian and Roman geography; the first being probably conferred by the Celtic or primeval inhabitants, the latter by the Belgic colonies. But etymological disquisitions are foreign to the present purpose.

The southern, most opulent, and most important division of Britain, has ever since the days of Bede, been distinguished among the European nations by the name of *Anglia*, or England, well known to have originated from the Angles, a nation of the Cimbric Chersonese, or modern Jutland, who conquered a considerable portion of the country.

EXTENT. The island of Great Britain extends from fifty to fifty-eight and a half degrees of north latitude, being of course about 500 geographical miles in length. Its greatest breadth from the

* Huet. Hist. du Com. et de la Nav. des Anciens, p. 194. Rennell, Geog. of Herodotus, p. 4.

Land's End to the North Foreland in Kent 320 geographical miles. In British miles the length may be computed at 580, and the breadth at 370.

BOUNDARIES. England is bounded on the east by the German ocean; on the south by the English Channel; on the west by St. George's Channel; on the north by the Cheviot Hills, by the pastoral river Tweed, and an ideal line falling south-west down to the Firth of Solway. The extent of England and Wales in square miles is computed at 49,450; and the population being estimated at 8,400,000, the number of inhabitants to a square mile will of course be 169*.

ORIGINAL POPULATION. The earliest population of this fertile country, which can be traced, is that of the Gael or Southern Celts, called *Guydels* by the Welsh, who regard them as their predecessors; and who have justly remarked, that the most ancient names, even in Wales, are Guydelic, not Cumraig or Welsh†. Those Gael appear to have proceeded from the nearest shores of France and Flanders.

As in later times the Belgic settlers in this country were subdued by the Northern Saxons, so the Celtic colony from the south was vanquished by the Cimbri of the North, the ancestors of the modern Welsh, who style themselves Cymri, and their language Cymraig, to this day. The original Gaelic inhabitants appear to have almost entirely evacuated the country, and to have retired to Ireland, also originally peopled from Gaul. There, and in the Highlands of Scotland, to which a Gaelic colony passed from Ireland, the Gaelic dialect of the Celtic language still exists.

To the Celtic population of England succeeded the Gothic. The Scythians or Goths, advancing from Asia, drove the Cimbri or northern Celts before them; and, at a period long preceding the Christian Æra, had seized on that part of Gaul which is nearest to Great Britain, where they acquired the provincial denomination of Belgæ‡. Their passage to England followed of course: and when Cæsar first explored this island, he informs us, that the primitive inhabitants were driven into the interior parts, while the regions on the south-east were peopled with Belgic colonies||. Those Belgæ may be justly regarded as the chief ancestors of the English nation; for the Saxons, Angles, and other northern invaders, though of distinguished courage, were inconsiderable in numbers. Till a recent period antiquaries had imagined that the Belgæ used the Celtic language, and had execrated the cruelties of the Saxons for an extirpation which never happened. But as it appears that two-thirds of England were possessed by the Belgic Goths, for six or seven centuries before the arrival of the Saxons, it is no wonder that no Celtic words are to be found in the English language, which bears more affinity to the Frisic and Dutch than to the Jutlandic or Danish.

Emolliated by four centuries of Roman domination, even the Belgic colonies had forgotten their pristine valour, and were unable to contend

* Boetticher's Tables—Knox computes Scotland with the Isles at 27,794, and Ireland at 27,457; France at 141,357 square miles.

† Lluyd Arch. Pref. ‡ Dissert. on Goths. || Lib. v. c. 10.

with their ferocious invaders from Scotland and Ireland, when chance, or invitation, conducted to their assistance new armies from the continent. The Jutes arrived in the year 449, and founded the kingdom of Kent about the year 460; they also took possession of the Isle of Wight. In 477, the Saxons first appear, and the kingdom of the South Saxons commences at that epoch. The West Saxons arrived in the year 495. The sixth century was considerably advanced, when those barbaric colonies were increased by the East Saxons in the year 527: but the first appearance of the great branch of the Angles, who were to perpetuate their name in the country at large, did not occur till the year 547, when the valiant Ida led his troops to Bernicia. The East Angles taking possession of Norfolk in the year 575, the southern and eastern coasts were almost wholly in the power of the invaders, who soon extending their conquests into the interior of the country, founded in the year 585, the kingdom of Mercia, the last of the Heptarchy*. Bede pronounces Mercia to have been an Anglic kingdom; and if so, their population may, perhaps, have equalled that of the Saxons themselves. Certain it is, that Procopius, a writer of the sixth century, classes the Angli in the first rank of the British nations of his time†. We shall not stop to inquire whether his *Frisones* be the Saxons or the Belgæ. The original documents evince, that all these new colonies, while they conquered by superior valour and hardihood, were far from being sufficiently numerous to form even a semblance of population. Scarcely an instance occurs of their being accompanied by women; and their invasions may, in part, be paralleled by the subsequent conquests of the Danes and Normans. Yet as the period was far more barbarous, the changes were greater; and the Belgic inhabitants, the genuine population, seem to have been reduced to various degrees of servitude, and to have constituted those numerous slaves mentioned in the Anglo-Saxon times, while intermarriages and other fortunate circumstances lightened the Norman chain. There seems little room to doubt that the Belgæ constituted the chief ancestors of the English nation, and that their language gradually prevailed, though tinged in the north with the Anglic or Danish, and in the [illegible] with the Saxon. This subject has been the more amply discussed, because it is not only of essential importance in itself, but because it has hitherto been clouded with many crude and erroneous assertions and opinions.

PROGRESSIVE GEOGRAPHY. The knowledge of the progressive geography of any country is indispensably necessary for the elucidation of its history. When the Romans entered Britain, they found the country, like others in the savage state, divided among a number of small tribes. With their usual policy they established large provinces. *Britannia prima* embraced the whole southern part of England, as far as the Severn and the Thames; *Britannia secunda* corresponded to modern Wales. *Flavia Cæsariensis* extended from the Thames to the Humber, a noble province, receiving its denomination from the imperial house of Vespasian, and his two successors, under whom some of the most important conquests were achieved. Vespa-

* Beda, Chron. Sax. &c. † Bell. Goth. lib. iv. c. 20.

sian himself was, in the reign of Claudius, the first general who began the real conquet of Britain*. The province of *Maxima Cæsariensis* reached from the Humber to the Tyne, from the Mersey to the Solway†. In the Roman times about thirty eminent cities, or rather towns, are enumerated, about nine of which are denominated colonies, though none of them could be of much importance; for while the Roman colonies in other countries issued abundance of coins, hardly one real coin even of Camulodunum, the most important colony, can be pointed out. Our antiquaries indeed have, with erroneous patriotism, transferred many Gallic coins, as British, and have amused their readers with many fabricated pieces of antiquity; but real medallists, English as well as foreign, hesitate greatly on the subject. A more detailed account of the Roman Geography of England does not fall within the present plan, and the curious reader must be referred to Horsley and Roy, authors of deserved estimation.

Saxon. The Saxon Geography of England has been partly above indicated; but the following table of the Heptarchy will present a more complete idea.

1. Kent comprehended the county of Kent.	
2. Sussex, or the South Saxons.	Sussex. Surrey.
3. East Angles,	Norfolk. Suffolk. Cambridgeshire, with the Isle of Ely.
4. Wessex, or the West Saxons,	Cornwall. Devonshire. Dorset. Somerset. Wilts. Hants. Berks.
5. Northumberland,	Lancashire. Yorkshire. Durham. Cumberland, Westmoreland. Northumberland, and the parts of Scotland to the Frith of Edinburgh.
6. Essex, or the East Saxons.	Essex. Middlesex. Hertfordshire in part.

* Tacitus, Vita Agricolæ, c. 13.

† Gough's Camden, cxxix. Roy's Map, &c.

7. Mercia,	Gloucester. Hereford. Warwick. Worcester. Leicester. Rutland. Northampton. Lincoln. Huntingdon. Bedford. Buckingham. Oxford. Stafford. Derby. Salop. Nottingham. The rest of Hertford*.

SHIRES. Ancient authors affirm, that the great Alfred instituted the first division of England into SHIRES, so denominated from a Saxon word, signifying parts cut off, or divisions. They are also denominated COUNTIES, as having been each governed by a distinct *Ealdorman*, corresponding with the Latin word *Comes*, or Count; and sometimes translated *Consul*, and sometimes *Comes*, by those Anglo-Saxon authors, who wrote in Latin. After the Danish conquest, this officer or grandee was known by another appellation, that of *Earl*, from the Danish *Iarl:* which like the word Baron, in its original acceptation, implied simply, but by way of great eminence, a MAN. About the eleventh century these titles became hereditary dignities; and the government of the shire devolved upon the Earl's deputy, the *Vice Comes*, *Shire-reeve*, Sheriff, or manager of the shire. A remarkable subdivision prevails in the extensive county of York, which was divided into three parts, implied in the Saxon word *Trythings*, now corruptly called Ridings. It is also generally believed that Alfred was the author of the subdivisions of counties, called hundreds and tythings, now seldom mentioned except in legal proceedings, and in topographical descriptions. It is probable that the hundred originally contained one hundred manors, or rather farms; while the tything was restricted to ten. Such are the chief features of the Saxon geography of England. The capitals of the several Heptarchic kingdoms varied at the will of the sovereign. London, which belonged to the East Saxons, maintained in some degree its Roman fame and eminence; but on the termination of the Heptarchy, Winchester was regarded as the capital of England. Further illustrations will arise under the head of Ecclesiastical Geography.

It must not however be forgotten, that the kingdom of Northumbria, comprising the regions north of the Humber, existed till the year 950, under its peculiar sovereigns, the last of whom was Eric: and that even Domesday Book, which was compiled in the time of William the Conqueror, excludes the three counties of modern Nor-

* Gough's Camden, cxxxi.

thumberland, Cumberland, and Westmorcland, then regarded as part of Scotland. Durham, the patrimony of St. Cuthbert, a province of ecclesiastic, not secular jurisdiction, is also omitted; and Lancashire is arranged under the divisions of Yorkshire and Cheshire. The kingdom of Bernicia at one period extended to the Frith of Forth; but in the latter Saxon times the boundaries of England on the north fell considerably short of their present extent. On the West, Offa king of Mercia restricted the Welsh by an extensive barrier, the remains of which are still called Offa's dyke*. It extended from the river Wye, along the counties of Hereford and Radnor into that of Montgomery, where it enters North Wales. It afterwards passes by Chirk Castle to the river Dee, and ends in the parish of Mold.

NORMAN. Few alterations of any consequence appear in the Geography of England in the Norman period. The northern limits were however extended to their present circuit. Cumberland and Westmoreland were wrested from the Scots, and the provinces north of the Humber were completely incorporated. On the west, Henry I, about the year 1120, having conquered a part of Wales, invited and established a Flemish colony† in Pembrokeshire, and one or two others of the most southern counties, which afterwards became remarkable for industry; a singular fact in modern history, though not unusual in ancient times, and for that period a remarkable stretch of political wisdom. The subsequent conquest of Wales by Edward I, and its gradual assimilation and association with England are sufficiently known.

HISTORICAL EPOCHS. Geography has been styled one of the eyes of history, a subservience to which study is undoubtedly one of its grand objects; but it would, at the same time, be foreign to its nature to render it a vehicle of history. The proper and peculiar subjects of geographical science are so ample, and often attended with such difficult research, that it becomes equally rash and unnecessary to wander out of its appropriated domain. In this work therefore it is only proposed briefly to mention the grand historical epochs of nations; and those events which have altered their boundaries and geographical relations.

The population of England by the Celts may be regarded as the first historical epoch.

The second is formed by the Belgic colonies; who, perhaps about three centuries before the Christian æra, seized the southern and eastern shores, and advancing by degrees restricted the Celts to the west. The Belgic colonization of England is important in many points of view, as establishing the primitive germ of the present English nation, and as introducing agriculture, which was not practised by the hunting and pastoral tribes of the Celts‡. nor is it improbable that some of the fertile districts of England have known cultivation for the space of two thousand years.

3. Under Julius Cæsar the Romans can only be said to have explored this island; and near a century elapsed before the real conquest

* Pennant's Wales, vol. i. p. 273. † Will. Malmsb. lib. v.
‡ Cæsar, lib. v. c. 10.

was commenced by Claudius; between whose reign and that of Domitian, the Roman Eagle had been displayed as far as the Grampian mountains. The fertility of the soil, and the Roman arts of civilization, softened the spirit even of the Belgic Britons, and inured them to docile servitude. Carausius and other chiefs seized the British purple, and availed themselves of the strong maritime barrier to bid defiance to the Cæsars; but their troops, and their mariners, had the name of Romans; and these were merely schisms of a vast empire, not assertions of native independence. The Britons on the contrary were afterwards forced to implore the assistance of the Romans against their few, but ferocious invaders.

4. After a duration of four centuries, the Roman domination yielded to that of the Saxons and Angles, nations congenerous with the Belgæ. This revolution has indelibly impressed the name, character, language, laws, manners, and customs of the people.

5. After repeated ravages in the preceding centuries, the Danes in the year 1016, dispersed the armed force of England, and gave three Kings to the country, Canute, Harold, and Hardicanute; but the dominion returned to the Saxon line in the year 1042.

6. On the death of Edward the Confessor, what is called the Conquest of England took place in 1066, under William the Norman. As the Normans, or Norwegians, had been settled in the north of France for a long time, they introduced the French language among people of rank, and even into legal procedure; a servile badge not even hitherto absolutely eradicated, though the motive must be applauded, as the property and personal security of successive generations are so intimately connected with the immutability of the national jurisprudence.

7. The great charter granted by John at Runnymede is deservedly esteemed a memorable epoch of English freedom.

8. The civil wars between the houses of York and Lancaster may be regarded as the next remarkable epoch. Though destructive of literature and the arts, they proved the perdition of a ferocious aristocracy; and thus established by degrees the third balance of the British constitution in the House of Commons.

9. The reformation, by delivering the nation from the heavy yoke of superstition, increased the national energies, and imparted freedom of thought, and a spirit of independence to the individual character.

10. The civil wars under Charles I, had the usual effect of impeding the course of literature and the arts; but by the violent changes and consequences, and the excesses committed on both sides, superinduced from experience, the only teacher of practical wisdom, a spirit of mutual forbearance and toleration; so that the subsequent revolutions have, to the eternal honour of the national character, been effected almost without bloodshed, and by the mere weight of national will and experience.

11. The revolution under William III, and the laws enacted upon that occasion, by the unchangeable establishment of the protestant religion, and many more minute emanations of freedom, still further contributed to national and individual independence; of which the

accession of the House of Hanover constituted an additional pledge and confirmation.

12. The war with the American colonies forms not only an epoch of singular novelty, but of the most important consequences. It perhaps presented the first instance in modern history, of a conflict between the parent state and its colonies. It was little disgraced with the atrocities of a civil war; and after a manly struggle was terminated with gentleness and moderation. The Americans broke their colonial bonds, but could not overcome their commercial, which must bind them to the parent state for some generations, if they do not even destroy their vaunted independence. The consequences of this revolution to the whole human race are incalculable; whatever they may be, an Englishman may well exult that his brethren have commenced a large empire in a new hemisphere, and may hope and wish that Asia and Africa may also be animated by the English character, which even envy must allow is inferior to none in the spirit of intelligence and improvement, in benevolence and integrity, and in rational and practical freedom.

ANTIQUITIES. The ancient monuments of a country are intimately connected with the chief epochs of its history, and particularly with the revolutions it has undergone by foreign conquest, or new population. The English antiquities fall of course into six divisions. 1. Those belonging to the primitive Celtic inhabitants. 2. Those of the Belgic colonies. 3. Those of the Romans. 4. Those of the Saxons. 5. Relicks of the Danes. 6. Norman monuments. Few of those remains, it must be confessed, throw much light upon history: but many of them being interesting and curious in themselves, they deserve the attention of the traveller and geographer.

BELGIC. A radical mistake in the study of English antiquities has arisen from the confusion of the Celtic and Belgic languages and monuments. The Druids have deservedly attracted much curiosity and research; but it would be erroneous to impute to them, as is usual, the whole of our earliest remains. Cæsar speaks of Druidism as a recent institution; and such being the case, it is probable that it originated from the Phœnician factories, established in wooden fortresses on the coast, the usual practice of commercial nations, when trading with savage or barbarous races. The tenets correspond with what little exists of Phœnician mythology, and the missionaries of that refined people might be not a little zealous in their diffusion. However this be, the ancient authors, from whom we derive our sole authentic information concerning the Druids, minutely describe their religious rites, but are totally silent concerning any monuments of stone being used among them. On the contrary, they mention gloomy groves, and spreading oaks, as the only scenes of the Druidic ceremonies. Yet our antiquaries will even infer, that Stonehenge is a Druidic monument, though it be situated in an extensive plain, where not a vestige of wood appears, and where the very soil is reputed adverse to its vegetation.

It might, perhaps, be a vain effort of antiquarian investigation, to attempt to discriminate the remains of the earliest inhabitants from those of the Druidic period; indeed, if we set aside the authorities

of modern antiquaries, commonly visionary and discordant, there is no foundation whatever for any sound or real knowledge of the subject. The following have been esteemed Druid monuments by Borlase: 1. Single stones erect: 2. Rock idols and pierced stones: 3. Rocking-stones used as ordeals: 4. Sepulchres of two, three, or more stones: 5. Circular temples, or rather circles of erect stones: 6. Barrows or tumuli: 7. Cromlechs, or heaps of stones: 8. Rock-basons, imagined to have been used in Druidic expiations: 9. Caves, used as places of retreat in time of war*. But as most of those relics may also be found in Germany and Scandinavia, it becomes hazardous to pronounce whether they be Gothic or Celtic; and, as we learn from ancient authors that the Germans had no Druids, to bestow the name of Druidic, upon such monuments, is the mere wantonness of conjecture. It is, however, most probable, that the earliest inhabitants, as is ever the practice in the infancy of society, made use of wood, not stone, in their religious as well as in their domestic erections. If we survey the various savage regions of the globe, we shall seldom or never perceive the use of stone; and it is certainly just to infer, that the savages of the west, were not more skilful than those of the east; nor those of the old continents and islands, than those of the new. However this be, a learned ignorance upon such topics, is preferable to an assumed and imaginary knowledge.

But as many of these monuments are found in Germany, Scandinavia, and Iceland; and as the Icelandic writers in particular, often indicate their origin and use, which are unknown in the Celtic records, there is every reason to attribute them to a more advanced stage of society, when the Belgic colonies introduced agriculture, and a little further progress in the rude arts of barbarism. The nature of this work will not admit a formal investigation of such topics, but a few remarks may be offered on Stonehenge, a stupendous monument of barbaric industry. Inigo Jones in attempting to prove that it is Roman, only evinces that no talents can avail when science is wanting, and that antiquities require a severe and peculiar train of study. Doctor Stukely, a visionary writer, assigns Stonehenge to the Druids; while Dr. Charlton perceiving that such monuments are found in Denmark, ascribed it to the Danes. If the latter had considered that the Belgæ were a Gothic nation of similar language and institutions, he might with more justice have extended its antiquity. From the Icelandic writers† we learn, that such circles were called *Domh-ringr*, that is literally *Doom-ring*, or circle of judgment, being the solemn places where courts were held, of all kinds and dignities, from the national council down to the baronial court, or that of a common proprietor of land, for adjusting disputes between his *villani* and slaves. The magnificence of Stonehenge loudly pronounces that it was the supreme court of the nation, equivalent to the *Champ de Mars et de Mai* of the Franks, where the king and chiefs assembled in the circle, and the men capable of arms in the open plain; nor is it improbable that the chiefs ascended the transverse stones, and declared their resolves to

* See Inquiry into Hist. of Scot. vol. i. p. 409.

† Landnama Saga, &c. &c.

the surrounding crowd, who, in the description of Tacitus, dissented by loud murmurs, or applauded by clashing their shields*. This idea receives confirmation from the circumstance that the Belgæ peculiarly so called, as being the chief and ruling colony of that people, were seated in the surrounding province, and *Sorbiodunum*, now Old Sarum, was their capital city.

Similar circles of stone, but far inferior in size, are found in many parts of Great Britain and Ireland; and several undoubtedly as late as the Danish inroads and usurpations, the practice being continued by that people at least till their conversion to christianity, in the tenth and eleventh centuries. Some of the smallest, as we learn from the northern antiquaries, were merely places of family sepulture. At a later period the circles of judgment, which had been polluted with human sacrifices, and other pagan rites, were abandoned; and the great courts were held on what were called *Moot-hills*, or hills of meeting, many of which still exist in the British dominions, and in the Netherlands. They commonly consist of a central eminence, on which sat the judge and his assistants; beneath was an elevated platform for the parties, their friends, and *conjurgators*, who sometimes amounted to a hundred or more; and this platform was surrounded with a trench to secure it from the access of the mere spectators. Of the other monuments of this period, a more brief consideration must suffice. When a monarch, or distinguished general, was buried, a barrow or hillock was erected to preserve his name and memory to future ages: the size depending on the reputation of the person, which attracted a smaller or larger number of operators. Such monuments are very ancient, and even to this day denote the sepulchres of some of the heroes of the Trojan war†. In later times a large single stone erected was esteemed a sufficient memorial: such single stones also sometimes appear as monuments of remarkable battles, or merely as boundaries. The caves are familiar to most nations in an early state of society.

Roman. The Belgic relics are followed by those of the Romans, which are mostly objects of mere curiosity, and rarely throw the smallest light upon the page of history. Amphitheatres are said to be still visible in Silchester, in Hampshire, and some other places. The Roman castle at Richborough, the ancient Rutupiæ in Kent, presents considerable remains of a massy wall cemented with surprising firmness. The Roman ruins in this country are commonly composed of stone or flint, with strata of flat bricks at considerable intervals. The mosaic pavements, hypocausts, &c. are generally the remains of the villas of opulent Romans, scattered over the country. The greatest number of Roman inscriptions, altars, &c. has been found in the North, along the great frontier wall, which extended from the Western sea, to the estuary of Tyne. This vast wall is justly esteemed the most important remain of the Roman power in England, as that of Antoninus is in Scotland. The extent was about 70 miles, and its construction, forts, &c. have been illustrated by the labour of several antiquaries.

* Germ. xi. Hist. v. 17. † Chevalier, Dallaway, and Morritt.

Numerous are the more minute relics of the Romans in England, as coins, gems, weapons, ornaments, and the like; among which, however, the silver dish belonging to the Duke of Northumberland, deserves especial mention. One of the grand causes of the civilization, introduced by that ruling people into the conquered states, was the highways, which form, indeed, the first germ of national industry, and without which neither commerce nor society can make any considerable progress. Conscious of this truth, the Romans seem to have lent particular attention to the construction of roads in the distant provinces, and those of England, which may still be traced in various ramifications, present a lasting monument of the justice of their conceptions, the extent of their views, and the utility of their power. A grand trunk, as it may be called, to anticipate the language of our inland navigations, passed from the South to the North, and another to the West, with branches in almost every direction that general convenience and expedition could require. What is called the Watling-street, led from Richborough, in Kent, the ancient Rutupiæ, N. W. through London to Chester. The Ermin-street passed from London to Lincoln, thence to Carlisle, and into Scotland, the name being supposed to be corrupted from *Herman*, which means warrior, as the chief wars lay in the North. The Fosse Way is supposed to have led from Bath and the western regions, N. E. till it joined the Ermin-street. The last celebrated road was the Ikenild, or Ikneld, supposed to have extended from near Norwich, S. W. into Dorsetshire*.

Saxon. The Saxon antiquities in England are chiefly edifices, sacred or secular; many churches remain which were altogether, or for the most part, constructed in the Saxon period; and some are extant of the tenth, or perhaps the ninth, century. The vaults erected by Grimbald, at Oxford, in the reign of Alfred, are justly esteemed curious relics of Saxon architecture. Mr. King has ably illustrated the remains of the Saxon castles. The oldest seem to consist of one solitary tower, square or hexagonal: one of the rudest specimens is Coningsburg Castle, in Yorkshire; but as that region was subject to the Danes, till the middle of the tenth century, it is probably Danish. Among the smaller remains of Saxon art, may be mentioned the shrines for preserving relics, which some suppose to present the diminutive rudiments of what is styled the Gothic architecture; and the illuminated manuscripts which often afford curious memorials of the state of manners and knowledge.

Danish. The Danish power in England, though of considerable duration in the north, was in the south brief and transitory. The camps of that nation were circular, like those of the Belgæ and Saxons, while those of Roman armies are known by the square form: and it is believed that the only distinct relics of the Danes, are some castles to the north of the Humber, and a few stones with Runic inscriptions.

Norman. The monuments styled Norman, rather to distinguish their epoch than from any information that Norman architects were employed, are reputed to commence after the conquest, and to

* Gough's British Topography, I. 10.

extend to the fourteenth century; when what is called the rich Gothic began to appear, which, in the sixteenth century, was supplanted by the mixed; and this in its turn yielded to the Grecian. In general the Norman style far exceeds the Saxon in the size of the edifices, and the decoration of the parts. The churches become more extensive and lofty, and though the windows retain the circular arch, they are large and more diversified; the circular doors are festooned with more freedom and elegance; and uncouth animals begin to yield to wreaths of leaves and flowers. The solitary keep, or tower, of the Saxon castle, is surrounded with a double wall, inclosing courts and dwellings of large extent, defended by turrets and double ditches, with a separate watch-tower, called the Barbican. Among others the Cathedrals of Durham and Winchester, may be mentioned as venerable monuments of Anglo-Norman architecture; and the castles are numerous and well known. What is called the Gothic, or pointed arch, is generally supposed to have first appeared in the thirteenth century; and in the next it became universal in religious edifices. The windows diffused to great breadth and loftiness, and divided into branching interstices, enriched with painted glass, the clustering pillars of excessive height, spreading into various fret-work on the roof, constitute, with decorations of smaller note, what is called the rich Gothic style, visible in the chapel of King's College, at Cambridge, and many other grand specimens in this kingdom. The spire corresponds with the interior; and begins about the thirteenth century, to rise boldly from the ancient tower, and diminish from the sight in a gradation of pinnacles and ornaments.

CHAPTER II.

POLITICAL GEOGRAPHY.

RELIGION.—ECCLESIASTIC GEOGRAPHY.—GOVERNMENT.—LAWS. POPULATION.—COLONIES.—ARMY.—NAVY.—REVENUES.—POLITICAL IMPORTANCE AND RELATIONS.

RELIGION. THE church of England is established upon a most peculiar basis, and truly characteristic of a moderate and judicious nation. As in the political system, extremes, the usual concomitants of inexperience, are carefully avoided, and despotism or anarchy, from whatever source, monarch, nobles, or people, prevented, as far as human wisdom can devise; so in the church, while the papal power, and other catholic chains are proscribed, the other extremes, tending to loose democracy, are equally avoided. It is the only reformed church which has retained the episcopal form in its ancient splendor; for though bishops may also be found in Denmark, Sweden, Norway, &c. they are rather inspectors of the conduct of the clergy, and of the modes of education, than prelates endowed with senatorial rank and dignity. In England, on the contrary, the bishops are peers of parliament, and have the style and importance of nobility. Yet the creed of the English church is rather Calvinistic than Lutheran. But the special tenets of the English church are sufficiently explained in the thirty-nine articles; and a brief idea of its government will be more pertinent to the present purpose.

CHURCH OF ENGLAND. The orders of bishops, priests, and deacons, compose the body of the clergy. Upon his dispute with the Pontiff, to avoid any claims whatever of superiority, Henry VIII seized the title of Supreme Head of the National Church, and issued several medallions with inscriptions in Hebrew, Greek and Latin, to commemorate this new prerogative, which is, indeed, important, as it blends the ecclesiastic with the civil administration. Next in dignity and power are the Archbishops of Canterbury and York. The first is styled Primate of all England, and precedes all persons, except the royal family. He has the power of probate of all testaments within his province, and of granting several dispensations concerning benefices: he has, also, four courts of judicature, that of Arches, of Audience, of Prerogative, and of Peculiars. The Archbishop of York is styled Primate of England, but in prerogative and jurisdiction yields greatly to the first Metropolitan*. The Archbishopric of York

* Chamberlayne, p. 3. 38th edit. 1755, 2 vol. 8vo.

extends over the counties of Northumberland, Durham, Cumberland, Westmoreland, Cheshire, Lancashire, and the Isle of Man, besides its proper and peculiar diocese, of the greatest part of Yorkshire and Nottinghamshire. That of Canterbury comprises the other counties; and has its peculiar diocese, being a great part of Kent. The archiepiscopal office is rather a dignity than a jurisdiction, and the Primates rarely interfere in any dioceses except their own. They are appointed by the king, in the same manner as the Bishops, by what is called a *Congé d'Elire*.

Bishops. Upon any vacancy in an episcopal see, the dean and chapter apply to the king, who returns a *Congé d'Elire*, naming the person to be chosen*. A chapter of the prebendaries is then summoned by the dean, and they are constrained under the penalty of a *præmunire* to elect the person nominated. The solemnity is completed by the royal assent, under the great seal, and by the confirmation and consecration, performed by the metropolitan, or in his name. The prelate afterwards pays homage to the king for his temporalities, or the baronies connected with the see; and compounds for the first fruits, that is, the revenue of the first year, which is paid to the corporation for increasing the benefices of the poor clergy. The omission of consecration is the only difference when a bishop is translated to another see; and when an archbishop is nominated, the king appoints four or more bishops to officiate at the confirmation.

The bishop alone may ordain deacons and priests, dedicate churches and burial grounds, and administer confirmation†. In former times episcopal jurisdiction extended to the licensing of physicians, surgeons, and schoolmasters, and to the conjunction of small parishes. At present it chiefly embraces questions of births, marriages, deaths, and testaments, and any delinquencies of the clergy: to which body, indeed, their attention is now chiefly confined, and they rarely, except in parliament, interfere in secular subjects. The Bishop of Sodor and Man has no place in parliament. All the other bishops are barons, and peers of the realm, by three different claims; in right of the baronies attached to their sees, as barons summoned by writ, and as barons by patent, a form which accompanies their consecration‡. Their privileges approach the regal; they are the sole judges in their own courts, and issue writs in their own names, not in the royal style used by other courts. They can depute their authority, which no other judge can; and their episcopal power of conferring orders, &c. may be exerted in any christian country, while lay peers are only acknowledged in the country whence they derive their dignities‖. To pass other more minute privileges, the Bishop of London, as presiding over the capital, has the precedence of all the others. The see of Durham constitutes a county palatine, with great powers and prerogatives: the authority and patronage of the bishop are of course very extensive, and even the king's judges only sit in his diocese by his permission. The Bishop of Winchester is the third in dignity, but esteemed the first in opulence, as the large civil list of Durham, while it adds power,

* Chamberl. 140. Blackstone, b. i. c. 11.
† Chamberl. p. 63.
‡ Chamberl. 67. Blackstone, b. i. c. 11.
‖ Chamberl. 68.

diminishes revenue. These three bishops precede all the rest, who take place according to the seniority of consecration.

PREBENDARIES, &c. To every cathedral in England belong several prebendaries as canons, and a dean, so styled as is said, *(Decanus,)* because he anciently presided over ten canons*. In the old quaint language he was called one of the bishop's eyes; while the arch-deacon, who had charge of the deacons, was reputed the other. The dean and the chapter of prebendaries assist the bishop in ecclesiastic affairs. The prebendaries are so styled from the prebend, or *pars præbenda*, portion of land or income alloted to them; and with the dean form a body, college, or corporation; and they have several privileges superior to the common or minor canons. At the reformation their salaries were mostly converted into money, but those of Durham preferred the ancient portions of land, which having prodigiously increased in value, they are now styled golden prebends, being worth from 800*l.* to 1200*l.* a year, while the bishop, out of 9000*l.* a year, has to support a great and unavoidable expenditure.

ARCH-DEACONS. The next order is that of the Arch-deacons, amounting in all to about sixty; their office is to inspect the moveables of the churches, to reform slight abuses, and to induct into benefices. Arch-priests, who, on the continent, share the labours of the arch-deacon, on a smaller scale, being superintendants over a few parishes, were in England also styled rural deans, but are now unknown. Subdivisions of government are so much controuled by the very nature of human affairs, that the power of the arch-priest almost corresponded with the Scottish presbytery, while the provincial synods are similar to bishopricks.

CLERGY. Of the clergy in general, the lowest order is that of deacons, whose office formerly was to superintend the poor; the ancient donations to the church being always assigned in three divisions, one to the poor, another for repairs, and the last for the clergy. At present the deacon's office is restricted to baptism, to reading in the church, and assisting the priest at the communion, by handing the cup only. Deacon's orders cannot be canonically received before the age of twenty-three years, those of a priest require twenty-four, and a bishop must be thirty. The curate is a clergyman appointed to officiate for another, and is so named from his having the care of souls; hence the French rather apply the term to the rector. If the predial, or great tythes of the parish, be impropriated, or converted into secular hands, the priest is termed a vicar, a name originally implying that they were the *vicarii*, or deputies of the rector; but if the tythes be entire the priest is styled rector. The churchwardens superintend the repairs and decorations of the church, and the requisites for divine service, and collect the alms of the parishioners; they are annually elected at Easter, and have sometimes sidesmen, a kind of assistants. The sacristan, corruptly called sexton, originally had the care of the furniture and plate of the church; and by a still greater corruption, the appellation is now applied to the grave-digger, when it ought to have been conferred on the parish-clerk.

* Chamberl. 69.

The clergy in general enjoy some peculiar privileges. Their goods are free from tolls in fairs and markets: they cannot be compelled to any office, civil or military: they are only amerced according to their temporal estate: nor are they assessed for a robbery committed in the hundred, or for watching, warding, high-ways, &c. &c.

CONVOCATIONS. Ecclesiastical courts still retain considerable power: the convocation, consisting of the archbishops and bishops, with a lower house of 150 members, only meets for the sake of form; but have not been allowed to deliberate since the reign of Anne*.

COURTS. Next in dignity is the court of delegates, acting by a special commission under the great seal; and to whom an appeal lies from the highest metropolitan court. The court of arches is so styled, because it was held in the arches of the church of St. Mary-le-bone, London, but now in the great hall, Doctors Commons; only doctors of the civil law are allowed to plead†. The court of audience is always presided by the archbishop himself, who decides any doubts concerning the admission to benefices, and dispensation of the bans of matrimony.

The next court is that of Prerogative, which judges of estates fallen by will, or intestate; the prerogative office is likewise in Doctors Commons. The court of Peculiars refers to several peculiar parishes, exempt from the jurisdiction of the bishops, but here amenable: the judges are sole and without jury.

ECCLESIASTICAL GEOGRAPHY. The ecclesiastical geography of England may be seen in the following table:

PROVINCE OF CANTERBURY.

1. Bishoprick of London, containing Essex, Middlesex, and part of Hertford.
2. Winchester.—Surry, Hampshire, Isles of Wight, Jersey, Guernsey, and Alderney.
3. Litchfield and Coventry.—Stafford, Derby, and part of Warwick and Shropshire.
4. Lincoln.—Lincoln, Leicester, Huntingdon, Bedford, Buckingham, and part of Hertford.
5. Ely.—Cambridgeshire.
6. Salisbury.—Wilts and Berkshire.
7. Exeter.—Cornwall and Devon.
8. Bath and Wells.—Somersetshire.
9. Chichester.—Sussex.
10. Norwich.—Norfolk, Suffolk, and a small part of Cambridge.
11. Worcester.—Worcester, and part of Warwick.

* Chamberl. 70, 1. 76. Gough's Cam. i. 147. Blackstone, p. 111. c. v.

† The degrees are only taken at the Universities, yet they chiefly practise in London, a college being purchased for their use, by Dr. Henry Hervey, where they communed together in a collegiate manner; whence the name of Doctors Commons, more properly called the College of Civilians, near St. Paul's, which being consumed in the fire of London, was rebuilt in 1672. The Procurators, or Proctors of these courts, are admitted by the Archbishop's mandate, acting as the Solicitors in other courts.

12. Hereford.—Hereford, and part of Shropshire.
13. Rochester.—Part of Kent.
14. Oxford.—Oxfordshire.
15. Peterborough.—Northampton and Rutland.
16. Gloucester.—Gloucestershire.
17. Bristol.—The city of Bristol, part of Gloucestershire, and County of Dorset.
18. Landaff.—Glamorgan, Monmouth, Brecknock, and Radnor.
19. St. David's.—Pembroke, Cardigan, and Caermarthen.
20. St. Asaph.—The greatest part of Flint, Denbigh, and Montgomery, and some part of Shropshire.
21. Bangor.—The counties of Anglesey, Caernarvon, Merioneth, and part of Denbigh and Montgomery.

PROVINCE OF YORK.

22. Durham.—Durham and Northumberland.
23. Carlisle.—Great part of Cumberland and Westmoreland.
24. Chester.—Cheshire, Lancashire, Richmondshire (which is part of York); with part of Cumberland and Westmoreland.
25. Isle of Man.

The valuations in the king's books are omitted, because even the comparative valuation would lead to ideas wholly erroneous. Several changes have taken place in the number and situations of the bishopricks since christianity was first established in this country, but these rather belong to the province of the antiquary.

Those who differ in tenets or forms from the established church, may, in general be styled Dissenters, though the term be more strictly applied to the Presbyterians and Independents. The other principal classes of dissidents, are the Papists, Methodists, Quakers, the Anabaptists, the Swedenborgians, and the Unitarians; the last class denying the Trinity, and believing only in one God, is now intermingled with the two first, who have considerably relaxed the strictness of their discipline. The Independents assert, that each congregation has a right to regulate itself, while the Presbyterians unite churches under various divisions, provincial and national. The clerical aristocracy of the Presbyterians was obtruded with great haughtiness upon the English nation, during the civil war in the last century, and was rendered the more odious, because it admitted no toleration: hence the English found that they had only exchanged one yoke for another, or rather ease for slavery, as ten presbyters amounted to one bishop, and superadded the petulance and moroseness of individual inquisitors. Milton and other friends of freedom, soon began to satirize the whole sect, and to fly for refuge to the independents, whose benevolence or address granted universal toleration. To this body Cromwell lent an iron hand; and, after annihilating the Presbyterian power in England, in a great measure subverted that of Scotland. The intolerant spirit of the Presbyterians originated with their apostle Calvin, whose cruelty to Servetus was balanced by surprising talents in clerical polity; it rendered their power singularly adverse to letters and taste, and no man of science who has studied the literary history of this country,

would wish for the revival of such domination. But at present Calvin would not recognize his disciples, as they have abandoned their polemical thistles, and cultivate the most elegant productions of the literary field. The papists used chiefly to abound in Lancashire, Staffordshire, and Sussex; they had potent chiefs, and were a formidable body; but the passage from superstition to contempt is so natural, that many have fled to the opposite extreme. Those who retain their faith, generally display moderation, which has been naturally increased by the late privileges extended to them.

The methodists are extremely numerous and respectable. They seem to allow the propriety of the creed and government of the church of England; but they require a more strict life, more fervent devotion, and more frequent and serious attendance upon divine worship, than is enforced by the establishment. A philosopher may well envy the mild creed, and universal charity, or fraternal love of the quakers; while he must allow with a sigh, that a nation of quakers could not exist, except all nations were of the same persuasion. The anabaptists disown infant baptism, and bathe the adult disciple. The learned Whiston admired their tenets, and their practice of anointing the sick with oil, which as he believed operated with miraculous power. The Swedenborgians derive their name from the Baron Swedenborg, a nobleman who exchanged his native country of Sweden, for a residence in England. After having published two folio volumes in the Latin language, upon the art of exploring mines, he was seized with a violent fever, and with great difficulty recovered. In his disordered imagination he seemed to maintain a frequent intercourse with the spiritual world; and he has published twenty or more vast volumes in quarto, also in the Latin tongue, replete with curious metaphysical ratiocination, interspersed with visions which are sometimes narrated with high poetical spirit and elegance. His system is so much adapted to the strongest propensities of human nature, that his disciples increased with great rapidity. His chief tenets are, that there is but one person of the Deity, namely, the Lord Jesus Christ; that the day of judgment is already passed, &c. &c. but his most alluring tenets partake of Mahometanism, in representing the connubial pleasures, and the other enjoyments of a future world, which he paints as similar to this state of existence, but far exceeding it in the gratifications of every sense, whether mental or corporeal.

GOVERNMENT. The constitution of England, the peculiar boast and glory of the country, and an object of admiration to other states, though attempted to be described by Montesquieu, has been little understood by foreigners, for it presents such an infinite number of practical ramifications, and is so intimately connected with the spirit and manners of the people, that a number of years would be required to feel and study its real effects; and even after the longest preparation, the best description must be but a portrait, devoid of life and of vital expression. A faint sketch alone can be here expected, and the fidelity of the outline must compensate for the want of detail.

The constitution of England is a limited monarchy, counterpoised by two senates, one of hereditary peers, the other of representatives, who are, or ought to be chosen by the people. Such senates were not

unknown to the other European nations, and have rather sunk into disuse from their own perversion of their power, than from the despotism of the sovereigns. In France, long before the States General were discontinued, their meetings had been execrated by the people; as instead of defending their privileges, the members only attended to their own private interests, and imposed exorbitant taxes, which were consumed by the greedy courtiers, with very small profit to the royal treasury. Hence, far from incurring any blame, the kings of France acquired great popularity, and were idolized by the nation, for delivering them from the scourge of a venal senate, which only served to increase oppression and expenditure. Many other instances might be adduced to prove, that the very existence of such senates depends upon their forming one body and soul with the nation at large; but it will be sufficient to mention the similar suicide which happened in Denmark, in the last century, when the people, disgusted with the selfish views of the senate, requested the monarch to annihilate it, and assume the entire power: and the absolute form of government has since continued, though modulated by several councils, which have the effect without the form of the senate. The English senates, on the contrary, owe their stability to a general concurrence with the popular voice; arising partly from their form, and partly from a sympathetic and gradual connection which pervades all ranks.

KING. Our lawyers pronounce that the king of England unites in his person the dignity of chief magistrate, with the sanctity of a priest: and the title of Sacred Majesty, appears to have commenced when he assumed the function of Head of the church. So august is his person, that even to mention or intend his death, is a capital offence, when in all other cases the deed alone is punishable. Fortescue, in his old emphatic language, has described the office of the king of England to be "to fight the battles of his people, and to judge them with most righteous judgment." At his coronation he solemnly swears to govern his people according to parliamentary statutes, and the law of the country; to maintain the protestant religion; and to preserve the legal rights and privileges of the bishops, clergy, and church.*

The royal prerogatives have never been strictly defined; and, perhaps it is preferable in a government, which aspires not to ideal perfection, but to practical benefit, that they should be capable of great energy and extent; as, in cases of emergency, even republics have been forced to entrust absolute power to a dictator. The acknowledged prerogatives are chiefly to declare war and to make peace, a power upon which the whole of public prosperity may be said to depend; to form alliances and treaties; to grant commission for levying men and arms, and even for pressing mariners; for the power of impressing into the land service, was abandoned in the reign of William and Mary; yet in cases of great peril, there can be little doubt but the king, in concurrence with parliament, might order every man to assume weapons of war. To the king also belong all magazines, ammunition, castles, forts, ports, havens, and ships of war: he has also the special management of the coinage, and determines the alloy, weight, and

* Chamberl. 52. Delolme 90.

value.* The prerogative also extends to the assembling, adjournment, prorogation, and dissolution of parliament; and to its removal to any place. The royal assent is necessary to impart validity to an act of parliament, though it has never become necessary to withhold it, since the management of the senate has become the professed office of the minister. The king may not only increase the House of Peers, but that of Commons, by empowering any town to send burgesses to parliament; yet the latter prerogative appears to have become obsolete, for in the reign of Charles II. the interference of the legislature was esteemed necessary to enable the city of Durham to send representatives. The sovereign also enjoys the nomination of all officers on sea or land; of all magistrates, counsellors, and officers of state; of all bishops, and other great ecclesiastical dignitaries; and is not only the fountain of honour but of justice, as he may pardon any offence, or mitigate the penalty. As Head of the church he may call a national or provincial synod, and with its consent enact canons, either relating to faith or practice. The other prerogatives are more minute, and more adapted to jurisprudential enumeration. The more important exceptions are, that he cannot enact new laws, or impose new taxes, without the consent of both houses of parliament.

PARLIAMENT. The parliament, or national council, claims the next consideration. Originally both the nobles and the commons met in one house; and as the greatest national events depend, not on design, but on chance, or more properly, the will of heaven, it is not impossible that the mere inconvenience of not finding halls large enough for our then ambulatory parliaments, might have occasioned the division into two houses, unknown in any other country, and which in fact may be regarded as the sole foundation of English liberty. The house of peers may be said to have existed from the earliest period of our history. Concerning the commons, authors are dissentient, the Whigs asserting that they formed a part of the *Wettena-Ge-Mot*, or the assembly of sages, and it is not improbable that commoners of distinguished ability, particularly in the laws, were admitted to that great council, which chiefly consisted of the military chiefs. On the other hand it seems improbable that delegates from towns should have been then known, as the idea seems too abstract and complex for a rude people. The Tory writers assert that there is no appearance of the commons, nor any authority for their parliamentary existence, prior to the 49th of Henry III. when the first records concerning them arise. However this be, the present constitution of the parliament of England, may certainly be traced to near the middle of the thirteenth century; but it remains unknown at what precise time happened the important separation of the commons from the peers.

PEERS. The Peers of England only require the full age of twenty-one years, to become hereditary senators in their several degrees of duke, marquis, earl, viscount, and baron, formerly created by investiture, or symbolic forms, but latterly by patent†. The Duke is so styled from the Latin *dux*, a leader or general; the title of Marquis

* Chamb. 48, &c. Blackstone, B. I. c. iii. &c.
† Chamb. 168. Blackstone, B. I. c. ii.

springs from the Gothic language, and implies the commander of a march or frontier: the earl and baron are also from the Gothic, and merely imply eminent men; the viscount is latin, and signifies the lieutenant of the count or earl. The various orders of nobility have been preserved more pure in England than in any other country; owing partly to the laws of primogeniture, partly to their senatorial office, partly to the institution of the college of heralds. In Germany, and some other countries, the nobility has fallen into comparative degradation, from the extension of the title to all the sons, and from the presumption of adventurers. The peers are privileged from personal arrest, except for treason, felony, and a few other high offences. They are not only exempt from serving in juries, but must be tried by a jury of peers, who return their verdict, not upon oath, but upon their honour. They are addressed by the ceremonial form of *My Lord*, corresponding with the French *Mon Seigneur*; and the law is so watchful of their reputation, that the statute of *scandalum magnatum* was enacted, to prevent any scandal against them, or discord between them and the people. Every peer may appoint a proxy to vote for him in the senate, a privilege unknown to the commons.

In the house of peers is placed the royal throne; but the monarch rarely appears, except at the meeting or prorogation of parliament, when he proceeds to the house in great state; the attendance of the commons is commanded, who stand below the bar, and the king pronounces his speech, generally the composition of the minister. The arrangement of the house of peers is well conceived, and produces a grand effect. The wool-sacks upon which the chancellor, and the judges when called for their advice, are seated, constitute a remarkable feature, esteemed symbolic of the staple commodity of the country. The appearance is yet more magnificent, when the peers sit as judges in Westminster-hall; the greatness of the persons, and the solemnity of the occasions, exciting impressions of singular sublimity.

Commons. The house of commons consists of knights, citizens, and burgesses, chosen by counties, cities and boroughs, in consequence of royal writs directed to the sheriff. To restrict the tumult of popular election, it was enacted by Henry VI, that none should vote for a knight of the shire, except freeholders worth forty shillings a-year, which at the present value of money, may be computed at twenty or thirty pounds. It is singular that copyholders were excluded. The elections for the cities and boroughs, are regulated by their charters and customs; sometimes only a few citizens have a right to poll, sometimes all the inhabitants. The members, and their menial servants, are exempted from arrest in civil causes, on their journey to parliament, during their attendance, and on their return; nor can they be questioned out of the house for any sentiment there uttered. It has been disputed whether the members be not rather to be regarded as representing the people at large, than as interested in particular districts, and obliged to listen to the voice of their constituents whose private interest might, perhaps, interfere with the general benefit. The commons form the grand inquest of the realm, and may impeach or accuse the greatest peers; but their chief privilege, and upon which their whole power entirely depends, is the levying of money, in which

they are deservedly so jealous that they will not permit the smallest alteration in a money-bill. This amounts to an almost absolute *veto* on any public measure, and especially on war. The house of commons consists of 558 members*; but by sickness, important offices, and indispensable avocations, the house rarely presents above two-thirds of the number. A speaker, or president, is chosen at the meeting of every new parliament; but is usually continued from one to another, as the office requires a complete and ready knowledge of the forms, and considerable abilities.

Acts of parliament, which constitute the statute law of the kingdom, may originate in either house, though they commonly make their first appearance in the house of commons. The procedure is in the following form. Any member may move for a *bill*, (the term *act* is not applied till all the stages be complete,) which being seconded, the mover, and others who support him, are ordered to prepare it. When presented, and leave given to bring it to the table, it is read by the clerk, the clauses are debated, and a day appointed for a second reading. After it is again read and debated, it is *committed*; that is, if important it is referred to a committee of the whole house, during which the speaker leaves the chair, and another member sits at the clerk's table as chairman: or, if little momentous, to a private committee, which meets in a separate chamber. When every paragraph has been carefully examined, every clause put to the question, and the blanks and amendments completed, the chairman makes his report. The amendments and added clauses are then read, and the speaker puts the question, whether they shall be read a second time; and being read and debated, the bill is ordered to be ingrossed, that is, fairly written on parchment. After the third reading, the speaker, holding the bill in his hand, enquires if it shall pass the house; if agreed to, the clerk writes on the bill *Soit baillé aux seigneurs*, or if in the house of lords, there is written *Soit baillé aux communes*. If the bill be rejected, it cannot be again moved during that session; and it is an usual mode to move that the bill be read in three months, when by exceeding the limits of the session, it amounts to a less invidious rejection. An advantage of the committee of the whole house is, that the members may answer and reply; whereas in the constituted senate no member can speak twice, except in explanation. A silent vote in the house of commons, is given by *aye* and *no*, in the house of lords by *content* and *not content*.

The proceedings in the house of lords are nearly similar; and if a difficulty arise, a conference is demanded in an appropriated chamber, where it is debated; and either compromised, or the bill abandoned. When a bill has passed both houses, the king, either in person or by commission, imparts his consent, the clerk repeating to public bills, *Le Roy le veut*, if private, *soit fait comme il est desiré*. The denial of the royal concurrence used to be *Le Roy s'avisera*.

The attention of the nation is chiefly bent upon the parliament, when grand political questions arise concerning war and peace, or affecting the constitutional liberties of the land. On such occasions the

* Since the union with Ireland 658.

utmost powers of eloquence are exerted; and specimens produced worthy of Greece or Rome. Such trials of elocution may either arise in the stages of a bill as before described; or by the special motion of a member for some particular object, or address to the throne.

Adjournments may frequently happen in one session, and the business is continued and resumed; but a prorogation terminates the session, and the bills not then passed must recommence their whole progress. By a modern statute, the death of the king does not, as formerly, terminate the parliament; which, on the contrary, had it been previously dissolved, may, on that event, resume its functions.

The forms of the house of commons are observed with great punctuality, and it is the special duty of the speaker to superintend their enforcement; a precaution indispensible in a popular assembly, as we may judge by having seen the senate of a neighbouring nation occasionally degenerate into a bear-garden. The house of commons is deservedly esteemed the very palladium of English liberty: they hold what is called the omnipotence of parliament, and if that power were not guided by principle, the ruin would be universal. Not the general execration of the human race, not the infamy eternized by the historic page, could ever avenge the injury done to their country; if instead of protecting the lives, properties, and liberties of the nation, by whom they are chosen for that sole purpose, they should, for the sake of perishable wealth or honours, become the betrayers of their brethren, and the sycophants of despotism, of whatever kind or description.

Such are the three grand component parts of the English constitution; but, perhaps, its most beneficial and popular effects, arise from the mode of administering justice, and other ramifications. For the sake of connexion, however, it is proper first to consider the Privy Council, and the other divisions of the government.

Privy Council. Under whatever form of monarchy, Privy Councils are found to be coeval with the state. It is impossible for one man, however transcendant his abilities, to manage the various business of the government. In the most barbarous periods, a few men of eminent birth or wisdom have been selected by the sovereign for his assistants. While the national assembly only met on solemn occasions, the advice of the Privy Council was ready on every emergency, and it hence became the chief engine of regular and continual authority. In England the powers of the privy council continue to be very extensive, even in modern times. At more ancient periods it acted in a high juridical capacity, was wont to be consulted, even by the judges, in decrees of great consequence, and the parliament used to transmit several important topics to its sole consideration.* At present it is chiefly employed in deliberations on affairs of sudden emergence; on peace and war; and special provinces of the royal prerogative. The members are chosen by the king; and on changes of administration are seldom erased, though the members in opposition never attend. They are styled Right Honourable, and are sworn to observe secrecy: the lowest at the board pronounces his opinion first, and the king, if present, concludes with declaring his judgment. A privy council is

* Chamberl. 83, and Blackstone B. I. c. v.

seldom or never held, without the presence of at least one of the secretaries of state; who, till the reign of Elizabeth, used to stand by the royal chair, but have since sitten at the board as privy counsellors.

Their office is of the highest trust and importance, and is at present divided into three departments. Dependent on the secretaries of state is the state-paper office at Whitehall, which has in charge the writings of state and council, dispatches, negociations, and the like, from ancient times, thus presenting most important documents of history.

Ministry. Even at an early period, when the monarch maintained in his own hands a great share of the administration of justice, and of the actual exercise of authority, there were intervals of absence or recreation, in which he delegated the chief management of business to some select person, usually an ecclesiastic, whose cultivated talents qualified him for such an important trust. To lend more weight to this substitute, he was commonly appointed chancellor, or chief administrator of civil justice, was president of the house of peers, and supported the royal influence in that great assembly. But in later times, when the management of the house of commons became the chief object of the crown, the chancellor of the court of exchequer, as superintendant of the public revenue, is the officer generally considered as prime minister. The distribution of fifty millions a-year, joined with the royal support, has recently carried his power to the highest elevation. Next to him in authority are the secretaries of state, who are followed by the chancellor, the treasurer of the navy, the president of the council, the paymaster of the forces, the commissioners of the treasury, and other persons of high trust.

Judicature. The judicature of England is worthy of the highest applause, with regard to precision and purity. It is, indeed, to be regretted that the vast number and confusion of the statutes, render the study of the laws peculiarly difficult, and that the number of officers and retainers on the courts of justice, swells the expenses of a suit to an enormous sum. But hardly can a country be named on the face of the globe, in which justice, civil or criminal, is administered with more integrity: bribes, so frequent in other countries, are totally unknown; and the saving of this expense must be candidly poised against other legal disbursements.

The trial by jury is another glorious feature of English jurisprudence, handed down from the Saxon times, and is justly regarded as the very safeguard of the lives, liberties, and properties of the nation. Its excellence has been respected by the Danish and Norman conquerors; and, it is hoped, will be venerated by the latest posterity.

Laws. The laws of England in general, form a noble code of justice and equity, the precious legacy of remote ancestors. The stream issued pure and salutary from the Saxon rock; and neither foreign sources, nor ravaging floods, have been able to contaminate its beneficial qualities. English jurisprudence regards the civil code as a relic of despotism; and rarely listens to the papal voice of the canon law. It would be idle and extraneous here to attempt, even a brief sketch of the laws of England. The most singular usages are what was termed *Borough English*, by which the youngest son, or in defect of issue, the youngest brother was to enjoy the heritage; as it

was to be presumed that his elder brethren had learned their father's business*. That of *Gavel-kind* is scarcely known, except in Kent, and has three branches; the heirs male share all the land-alike; each heir may sell or alienate at the age of fifteen; and though the father be attainted of treason, the inheritance passes to the progeny†. In no country are wills so much venerated by law: that of Mr. Thelusson furnishes a recent example.

JURY. All trials, upon common and statute law, are determined by a jury of twelve, chosen as unobjectionable, from a larger number summoned by the sheriff. They have their station in the court, near the judges; and when the examination of the witnesses, and the pleadings are ended, a judge recapitulates the whole evidence and arguments, and states the law: after which the jury retire, for a shorter or longer space, as doubts may arise. Upon their return the foreman declares the verdict, which must be unanimous. The necessity of unanimity, has occasioned many difficulties; and it seems preferable to decide by the mere majority, as is done in Scotland in criminal cases. The forest and bye-laws may here be omitted; but a more vigorous branch of English judicature must not be forgotten. Martial Law, or the *Lex Castrensis Anglicana*, may be clearly traced to the reign of Henry V, who issued a code of military statutes, published by Upton and Grose. The statutes chiefly relate to sacrilege, prisoners, robbery of merchants, &c. &c. and refer solely to the actual exercise of war: the pain of death rarely occurs, except in the case of any person who cries *havoc*, an expression seemingly equivalent to "no quarter." Martial law may be proclaimed by the king, regent, or lieutenant general of the kingdom; and even in time of peace, though the prerogative be rarely employed, except during war. It is in fact a dictatorial power, never exerted except on great emergencies. The trials are summary and severe, as the necessity of the case authorises.

COURTS OF JUSTICE. In a short view of our courts of law, the next in dignity to the house of lords is the court of king's bench, so called because the sovereign was understood to judge in person, and its jurisdiction of course extends to the whole kingdom. The presiding judge is denominated Lord Chief Justice of England. Here are chiefly determined what are called pleas of the crown; and appeals lie from several other courts. The court of chancery judges causes in equity, to moderate the rigour of the law, and defend the helpless from oppression, and especially to extend relief in three cases, fraud, accident, and breach of trust. The chancellor himself is the supreme judge. The master of the rolls, or keeper of the important papers enrolled in chancery, is an officer of great dignity, and considerable patronage. The office of the rolls contains the charters, &c. granted by Richard III, and his successors; those of more remote antiquity being lodged in the tower. The court of common pleas judges, as the name imports, of the common suits between subject and subject; and tries all civil causes, real, personal, or mingled, according to the precise precepts of the law. The court of exchequer, so termed from the ancient mode of accounting upon a checquered board, de-

* Chamberl. v. i. 188. † Ibid. 17.

cides all causes relating to the royal treasury or revenue. The lord treasurer, and the chancellor of the exchequer, may be regarded as honorary presidents, while the first actual judge is the lord chief baron. Three other judges, and many officers, belong to this high court. There is also a court for the duchy of Lancaster, having cognizance of the revenues of that duchy, annexed to the crown by Henry IV*.

Circuits. For the more commodious and general distribution of justice, the kingdom is divided into six circuits, which are visited by the judges in the spring and autumn, when they sit and determine all causes of importance, civil and criminal; a method much to be preferred to the sedentary parliaments of France, in which the judges were biassed by local attachments. In the meanwhile more minute cases are determined by the justices of the peace, who may be traced to the fourth year of Edward III. Their office is chiefly to commit criminals to prison, and to inspect the execution of some particular laws relating to the poor, high-ways, and the like. They have a commission under the great seal, and the most respectable are styled justices of the quorum, from the words in the commission, *Quorum* A. B. *unum esse volumus*. The *custos rotulorum*, or keeper of the rolls, produces them at the quarter sessions, where the justices meet once in three months: the grand inquest, or jury of the county, is here summoned, which enquires concerning crimes, and orders the guilty to jail till the next circuit or assizes.

Sheriffs. The office of sheriff, or præfect of the county, is to execute the royal mandates, to impannel juries, to bring persons to trial, and to see the sentences executed, to collect fines, and remit them to the exchequer, and to preserve the tranquillity of the shire. On the circuits he meets and attends the judges, with a gallant train of officers and servants. The sheriffs are annually pricked with a golden needle, by the king, out of a list of six gentlemen of the county, drawn up by the itinerant judges.

Anciently there was a bailiff in every hundred, but the office is now rare, or fallen into disuse. The constables personally assist in the preservation of the peace, and execute the warrants of the justices. The coroner was originally a man of high rank, who shared the power of the sheriffs, particularly in what regarded the pleas of the crown; at present his duty is to enquire, by a jury of neighbours, into cases of violent death. The clerk of the market superintends the weights and measures, and it were to be wished, for the benefit of the poor, that the office were multiplied, and strictly enforced.

Such are the chief magistrates in the country. Cities and towns are generally ruled by a mayor and aldermen, or by similar officers, under different appellations, whose juridical power little exceeds that of the justices of peace. If a town send members to parliament, it is denominated a borough. The villages are chiefly under the authority of the lord of the manor, who holds courts, and retains many relics of feudal jurisdiction; and, in the words of a well-informed writer, "Every little village hath almost an epitome of monarchical govern-

* Blackstone, b. iii. c. 4.

ment; of civil and ecclesiastical polity within itself; which, if duly retained, would render us a very happy people.*

To enumerate the various punishments inflicted by the laws of England, would be an unnecessary task. It has been justly observed that they are too sanguinary, and that their frequency diminishes the intended purpose of impressing terror. If death were only inflicted in cases of murder, the relaxation would be found beneficial to the community. As man is an animal reared with considerable difficulty, and may generally be rendered useful, it would certainly be preferable to send criminals for life to the new and distant Asiatic settlements, than, by the waste of blood to lessen strength and population.

POPULATION. The population of England has generally been estimated at eight millions; but some writers raise it to a greater amount. That of the capital alone has been swelled to a million, though reduced by more precise calculations to about seven hundred thousand.† It is to be hoped that the surveys of the several counties, commenced by the board of agriculture, and the recent parliamentary inquiries, will speedily bestow more precision upon the statistic economy of the country.‡ Sufficient materials do not yet arise for exact

* Chamberl. 129. † See Middleton's Middlesex, p. 451.

‡ It may with exultation be added to the account of the population of England and Wales, that, from the recent enumeration, it must fall little short of NINE MILLIONS AND A HALF. The population of Great Britain and Ireland may be safely rated at FOURTEEN MILLIONS. The abstract of the returns. Dec. 8th, 1801, forms a folio volume of 503 pages, comprising the population of every parish. At the end is the following General Total:

	HOUSES.			PERSONS.	
	Inhabited.	*By how many families.*	*Uninhabited*	*Males.*	*Females.*
England	1,467,870	1,778,420	53,965	3,987,935	4,433,499
Wales	108,053	118,303	3,511	257,178	284,368
Army, Navy, &c				469,188	
Convicts on board the hulks.				1,410	
	1,575,923	1,896,723	57,476	4,715,711	4,627,867

	OCCUPATIONS.			TOTAL OF PERSONS.
	Persons in Agriculture.	*In Trade and Manufactures.*	*Other Persons.*	
England	1,524,227	1,789,531	4,606,530	8,331,434
Wales	189,062	53,822	266,573	541,546
Army, Navy, &c				469,188
Convicts on board the hulks				1,410
	1,713,289	1,843,353	4,873,103	9,343,178

enumeration of the various classes of inhabitants, a most important barometer of the political state.*

The first Abstract (printed July 1801) presents the following statement:

Regular Forces, Fencibles, and Militia, on March 10th, 1801,		186,733
Artillery, and Engineer Forces	ditto	11,618
Seamen, and Marines in the Royal Navy	ditto	106,128
Marines at head-quarters	ditto	20,151
Seamen employed under the Board of Customs,	ditto	897
Seamen employed in registered trading vessels,	ditto	143,661
		469,188

In the complete report the total population of London, Westminster, and Southwark, is 864,845, including the parishes not within the bills of mortality, namely Mary-le-bone, Paddington, St. Pancras, Kensington, and Chelsea, amounting to 117,802. Islington and Newington Butts are within the bills. Of the other chief cities, Manchester is rated at 84,020; Liverpool, 77,653; Birmingham, 73,670; Bristol, 68,645; Leeds, 53,162; Plymouth, 43,194: all the others are under 40,000.

* Towards the beginning of the last century, Gregory King, an able political calculator, drew up the following table of the ranks of persons in England. It must be premised, that he has followed an exceptionable mode, in including the domestics in the families of each rank, whereas male and female servants ought to have formed a class apart.

Ranks.	Number of Families.	Heads in each.	Number of Persons.
Spiritual Lords	26	20	520
Temporal Lords	160	40	6,400
Knights	600	13	7,800
Baronets	800	16	12,800
Eminent clergymen	2,000	6	12,000
Eminent merchants	2,000	8	16,000
Esquires	3,000	10	30,000
Gentlemen	12,000	8	96,000
Military officers	4,000	4	16,000
Naval officers	5,000	4	20,000
Persons in lesser offices	5,000	6	30,000
Persons in higher offices	5,000	8	40,000
Lesser clergymen	8,000	5	40,000
Lesser merchants	8,000	6	48,000
Persons in the law	10,000	7	70,000
Persons of the liberal arts	15,000	5	75,000
Freeholders of the better sort	40,000	7	280,000
Shopkeepers and tradesmen	50,000	4½	225,000
Artizans	60,000	4	240,000
Freeholders of the lesser sort	120,000	5½	660,000
Farmers	150,000	5	750,000
Gipsies, thieves, beggars, &c.	——	——	30,000
Common soldiers	35,000	2	70,000
Common sailors	50,000	3½	150,000
Labourers and out-servants	564,000	3	1,274,000
Cottagers and paupers	400,000	3	1,300,000
			5,499,520

It is now supposed that near 1,600,000 persons are employed in manufactures, and Mr. Young (Northern Tour, vol. iv. p. 364.) computes that 2,800,000 are occupied in farming. The number of domestics allowed by King, might be in part computed, by reducing the superior families to four. The number of paupers and beggars, who, in fact, detract from the national strength, can now scarcely be supposed less than a million. The sailors and soldiers amount

COLONIES. To the enumeration of the inhabitants of England, may be added many exterior colonies and settlements, the most important of which are now in Asia; but as the climate of Hindostan is rather adverse to European constitutions, it may be doubted whether our settlements there, though containing a considerable population, can be considered as permanent colonies. The natives subject to Great Britain cannot be now calculated at less than forty millions, in itself an empire. The acquisition of the Dutch settlements, the colony of New Holland, and more minute stations must also be taken into the account. In America, and what is called the West Indies; Canada, Nova Scotia, Newfoundland, and the more northern settlements, with Jamaica, and the other islands, may perhaps contain a million. In Africa, the Settlements, at the Cape of Good Hope, the Island of St. Helena, and at Sierra Leone, present an insignificant number, and Gibraltar is rather to be regarded as a military station. If we compute the North American States, detached from the mother country, at a population of five millions, England at seven, Scotland at two, Ireland three, and our colonies and settlements at two millions, we shall find in the various regions of the globe an increasing population of nineteen or twenty millions, diffusing the English language and manners to a vast extent.

ARMY. The army of England has latterly engrossed a considerable share of the population. It is estimated in regulars at 41 regiments of cavalry, and 144 of infantry, while the fencibles form 45 regiments, and the militia 86, exclusive of artillery and engineers.* The *effective* rank and file, including invalids, militia, and foreign corps, as well as the regular and fencible troops, was returned to the secretary of war, in December 1800, as amounting to 168,082. The volunteer corps in Great Britain and Ireland, may probably amount to 60,000 effective men.†

NAVY. But the great rampart, and supreme glory of Great Britain, consist in her navy; in size, strength, and number of ships, far exceeding any examples on record.‡ If abundance of documents

to about 400,000. The shopkeepers are perhaps triple. With these additions, &c. it would be easy to swell the list of our present supposed population to eight millions. The reader may also consult Mr. Grellier's table of the productive and unproductive classes, in the Monthly Magazine, vol. x. p. 27; but as he estimates the population of England at only five millions and a half, his assumptions cannot entirely be credited, while some late writers, on the contrary, increase the population of England alone to eleven millions!

* Army List, Jan. 1801.

† So the daily papers, yet by the same authority, the secretary of war, on the 16th Feb. 1801, computed the regulars at 193,187; militia, 78,040; fencibles, 31,415; in all, 302,642. The expense near thirteen millions! This computation, though including Ireland, seems exaggerated.

‡ In November last, 1801, the Minister adduced to the House of Commons, the following comparative statement of the navies of Great Britain and France.

Navy of Great Britain.			*Navy of France.*		
1793. Ships of the line.	135	1801. 202	1793. Ships of the line.	80	1801. 39
Frigates and smaller vessels	133	227	Frigates	64	35
	268	429		144	74

did not exist, the following genuine list would scarcely be credited by posterity.

NAVY LIST, JANUARY, 1801.

STATEMENT OF THE DISTRIBUTION OF THE BRITISH NAVAL FORCE, EXCLUSIVE OF THE HIRED ARMED VESSELS, WHICH ARE CHIEFLY EMPLOYED IN PROTECTING THE COASTING TRADE OF GREAT BRITAIN.

	Line.	Fifties.	Frigates.	Ships, &c.	Total.
In Port and fitting	27	7	46	98	178
Guard Ships	4	0	1	0	5
In the English and Irish Channels	33	1	26	45	105
In the Downs and North Seas	9	1	17	36	63
At the West India Islands, and on the passage	1	0	21	24	46
At Jamaica	5	1	22	12	40
In America, and at Newfoundland	2	0	4	5	11
Cape of Good Hope, East Indies, and on the passage	10	8	20	19	57
Coast of Africa	0	0	1	3	4
Coast of Portugal, Gibraltar, and Mediterranean	16	2	53	28	99
Hospital and Prison Ships	16	1	1	0	18
Total in Commission	123	21	212	270	626
Receiving Ships	9	1	7	0	17
Serviceable, and repairing for service	2	0	1	0	3
In ordinary	44	3	23	44	114
Building	17	2	8	0	27
Total	195	27	251	314	787

To this may be subjoined the list of captures from the several hostile powers, from the commencement of the war, to January 1801, after premising that many of them were already included in the above state of the navy:

	Line.	Fifties.	Frigates.	Ships, &c.	Total.
French	54	2	137	145	338
Spanish	8	0	14	31	53
Dutch	17	8	32	32	89
Total	79	10	183	208	480
Privateers of all nations					832
			Grand total		1312

For this immense fleet, the number of seamen annually voted, amounts from a hundred to a hundred and twenty thousand; a number almost incredible, and which no other country, ancient or modern, could have supplied. In China, indeed, half of the inhabitants may be said to live on the water, but in skill, spirit, and enterprize, are far inferior to British seamen.

NAVAL POWER. The naval power of Great Britain, constitutes so striking and important a feature in the national portrait, that it merits particular illustration. Even in the Saxon times we find considerable fleets mentioned of the small vessels then in use. One of the Northumbrian monarchs assembled a numerous fleet near Jarro, the monastery of Beda, in an extensive haven of the time, now become a salt marsh. About the year 882, we find that Alfred directed a powerful fleet against the Danish invaders;* but it is to be regretted that the early writers have not been more particular with regard to the number and form of the vessels. The fleet of Edgar is also celebrated; but the author of the Saxon Chronicle assures us, that the armament of Ethelred II, in the year 1009, exceeded any which England had ever before beheld; and as William of Malmesbury computes that of Edgar at four hundred vessels, this may probably have amounted to five hundred of the small ships then known. But the devastations of the Danes and Normans occasioned such a decline in the naval power of England, that Richard I, was obliged to have recourse to foreign vessels for his crusade. In the reign of John, we, for the first time, find commemorated a signal victory of the English and Flemings, over the French fleet of Philip Augustus, which was computed at seventeen hundred ships, or rather boats.† The English monarch John, insolent in prosperity, mean in adversity, in the pride of his triumph, was the first who ordered the SALUTE to be paid by foreign vessels to the national flag. The fleet of England thenceforth continued to be always respectable, and generally victorious. In the reign of Edward III, it had acquired such pre-eminence, that in his gold coin, the first struck in England, he appears in a ship, the symbol of commeree and maritime power; but the preponderance of the English armaments, over those of France, only became permanent and decisive, a little more than a century ago, after the battle of La Hogue. Spain had yielded the contest since the destruction of her great armada; and Holland had been greatly reduced in the naval conflicts under Charles II; so that no other rival remained, and Great Britain maintains a fixed superiority over the ocean. In the mechanism of ships, the French builders certainly excel; but, in the soul of ships, spirited, alert, and skilful seamen, no country can pretend to vie with Great Britain. The progress in number of vessels has been more rapid in this reign, than at any former period, as may appear from the comparative statement

* See Asser Vita Alf. St. Croix, Hist. de la Puisance Navale de l'Angleterre, Paris 1786, 2 vols. 8vo.

† Near Dam, in Flanders, A. D. 1213. Damme, now inland, a league N. E. of Bruges, was formerly a maritime town, and the sea washed its walls. Guicc. Disser. Belg.

in the note, which includes every military vessel, from the first rate to the frigate.*

The special superintendance of the navy, is committed to the board of admiralty, composed of admirals of known skill, and of peers, whose impartiality generally regards merit alone in this important service. The recent conduct of maritime war, has been crowned with distinguished success; and whilst the admirals must be allowed to rival any names in naval history, ancient or modern, the fame of Spencer has become as dear to patriotism as to literature.

Before the revolution, the impressing of men was legal, even for the land service; and in more early times, many forms of requisition were usual, workmen were impressed to build royal castles, artists for their decoration, and even singing boys for the chapel. Amidst a wide diffusion of liberty, and that individual security which is the most homefelt blessing of our constitution, it has been found impossible to abandon the impressing of seamen. The army naturally supports itself, for war, by producing a stagnation of manufactures, raises a supply of soldiers; but the seamen must be trained and inured to their peculiar element and profession; and the service being absolutely indispensable, it becomes a measure of political necessity to enforce it, if not offered voluntarily. This unavoidable additional hardship upon a class of men, subject to so many toils and deprivations, is deeply to be regretted; and every endeavour should in justice be exerted, to render their situation as comfortable as possible, and to impart to them a share of the national opulence, which their vigour so zealously protects.

Revenue. In ancient times, the royal revenue chiefly arose from the domains or lands appropriated to the crown; from amerciaments civil and criminal, which passed to the fisc, or treasury; and from customs on goods imported and exported. As in war each soldier was obliged to maintain himself for a certain time, the expenditure was not much increased. Upon extraordinary emergencies, it appears that a contribution was raised by the consent of the national council. In later periods, subsidies were granted to the amount of a fifteenth, or a tenth, on the landed income, and a proportionable rate on moveable goods. As society advanced, taxes began to be imposed on the materials themselves; and from a small plant an enormous tree has arisen, with a labyrinth of roots, which, in the opinion of some politicians, undermine the island, while others believe that they only produce a more firm consolidation.

The excise forms one of the most productive branches of the revenue, amounting to between seven and eight millions. Next stand

* Under James II.		173
	William III.	273
	Anne	284
	George I. in 1721	206
	George II. in 1734	208
	1746	276
	1755	241
	George III. 1762	343
	1801	787

the customs, which produce about half that sum. The stamps and incidental taxes, as they are termed, arise to near three millions. The land tax has been recently rendered perpetual, and sold to the proprietors of estates, and other individuals, a measure which has had a favourable effect in raising the price of stocks. But instead of the land tax, now appear those on sugar, tobacco, and malt, amounting to 2,750,000*l.* other supplies arise from the East India Company, lotteries, &c. In addition to all these, the income tax is supposed to yield 7,500,000*l.* and, if rendered perpetual, might swell the permanent revenue to 25 or 26,000,000*l.* But, in the year 1799, it was supposed that the additional sums raised by loans, &c. swelled the national expenditure to near 60,000,000*l.* sterling*.

Of the permanent taxes, the greater part is employed in discharging the interest of the national debt, which, after the American war, amounted to more than 239,000,000*l.* while the interest exceeded 9,000,000*l*†. At present the national debt is about 480,000,000*l.* and the interest about 19,000,000*l.* To alleviate this growing burden, a sinking fund was instituted in 1786, by which between 20 and 30,000,000*l.* may be considered as already redeemed.

The national debt began in the reign of William, and grew into what have been called the funds, or stocks, only synonymous terms for the public debt‡.

The taxes have not only increased the expense of every article of life, but have of course so enormously swelled the disbursements of war, that perhaps in a short time it may become too dear a game, even for princes. During peace the national expenses are greatly reduced. The civil list, from which are defrayed the salaries of officers of state, judges, ambassadors, &c. together with the expenses of the royal family, amounts to about 1,000,000*l.* annually.

Political Importance and Relations. With such a prodigious command of national treasure, the political importance and relations of Great Britain, may be said to be diffused over the world, for wherever money influences man, there may her power be perceived. The union of Scotland with England, delivered the latter country from the perpetual check, exercised by politicians, ancient and modern, that of exciting an enemy from behind, and thereby dividing the power of an antagonist. That with Ireland, if preserved by wise and lenient measures, must also impart additional energy. The most important political considerations, are those between Great Britain and France. It seems hardly reconcileable to humanity, or to any idea of divine benevolence, to style any country the natural enemy of another: but human affairs, alas, are seldom conducted with pure benevolence

* For 1801, the minister computed it at 42,268,000*l.* but the real amount was not capable of being foreseen.

† In 1790, the national debt was 247,981,927*l.* the interest and charges of management, 9,469,117*l.*

‡ See Mortimer on the stocks, where the reader will find a curious account of stock-jobbing, or buying against time, a species of gambling. In public loans, ib. 172, the engager commonly gains ten per cent. while the laws against usury are only put in force in private transactions. Hence new loans are greedily filled.

and humanity, and cannot possibly be, till all nations become benevolent and humane. If France must not be styled the natural enemy of Great Britain, she has, for many centuries, been a constant and jealous rival; eagerly embracing every opportunity to lessen British prosperity and power; an impulse which will probably continue till all men shall become philosophers; or, in other words, shall be ruled by the maxims of universal reason; a perfection too visionary to be expected, as man, in all ages and climates, and under whatever forms of government, has ever been found to be chiefly influenced by his habits and passions. Such being the case, it has ever been regarded as the political interest of England, to balance and divide the enmity of France, by a strict alliance with some limitaneous state. In this point of view, even Savoy has been found useful, though its power be only adequate to a slight diversion. Nor are the German states bordering on France, Swabia, and the two circles of the Rhine, nor even Switzerland itself, capable of much exertion. Hence it might seem that sound policy would dictate as complete a consolidation of German power, as could be effected, in order to give a decided and vigorous check to that of France from behind. The possession of the Netherlands by the powerful house of Austria, was certainly of great moment to the safety of Great Britain, especially since Spain and Holland have fallen into decline. The latter country presents, however, a connection of superlative importance to England, being her grand mart of trade with the continent. Russia, a most powerful monarchy, though once drawn into the vortex of the present grand commotion, is too remote to afford lasting assistance; but her amity is valuable in a commercial view, and as she might, by no great stretch of oriental power, detach an army into Hindostan, and overturn our opulent possessions. An alliance with Prussia has ever been regarded as desirable, though not of such consequence against France as that with Austria. The connection with Portugal has been enforced by mutual advantages of commercial intercourse*; and by the family compact between France and Spain. As to Denmark and Sweden, their friendship or enmity is little momentous; but as Sweden has long maintained a strict connection with France, it is most natural that Britain should balance it, by cultivating that of Denmark.

Such seem to have been the leading ideas of political writers, concerning the chief relations to be maintained by the British empire.

* Firmly established by the Methven treaty, 1703. These considerations were written before the connection of Russia, Sweden, Denmark, and Prussia, with France.

CHAPTER III.

CIVIL GEOGRAPHY.

MANNERS AND CUSTOMS.—LANGUAGE.—LITERATURE.—THE ARTS.—EDUCATION.—UNIVERSITIES.—CITIES AND TOWNS.—EDIFICES.—ROADS.—INLAND NAVIGATION.—MANUFACTURES AND COMMERCE.

MANNERS AND CUSTOMS. THE singularity of manners in England, has often excited the surprize of foreigners, and the attention of our own ethic writers, who have attempted to deduce the sources from moral and physical causes; estimating as the first, the freedom diffused over the country, which permits the indulgence of individual inclination; and recurring for the latter, to the perpetual variations of the climate, producing effects of electric sympathy on the animal spirits.

The consideration of national manners may be conveniently referred to four divisions: 1. Birth, marriage, death; 2. diet; 3. houses and dress; 4. amusements.

The ceremonies of baptism, marriage, and burial, admitting of few variations in most Christian countries, it becomes necessary to consider that division. The English are generally esteemed to exceed in the use of animal food; but, after the recent importations of French emigrants of all classes, this position begins to be doubted. If stomachic diseases be really more frequent than in other countries, they may more justly be ascribed to our potations of heavy malt liquor, which deservedly strike foreigners as a singularity in English diet. Even our lightest liquors of that sort have not escaped their remark; for a late French traveller has observed, that the English commonly drink at their meals a sort of medical ptisan, which they call *small beer*. Our ancestors prided themselves in the variety and richness of their ales, and old writers enumerate many sorts, as Cock, Stepney, Stitchback, Hull, Derby, Northdown, Nottingham, Sandbach, Betony, Scurvy-grass, Sage-ale, College-ale, China-ale, Butler's-ale, &c.* nor even at present do we refuse praise to the various qualities of our Burton, Dorchester, Taunton, Scottish, and other ales. But the most peculiar malt beverage is porter, which ought to be solely composed of brown or high-dried malt, hops, liquorice, and sugar, but is sometimes debased by other ingredients: that of London is particularly famous, and is an article of exportation, being esteemed a luxury on the banks of the Delaware and the Ganges. Punch was another national liquor, composed of spirits, water, acids, and sugar, but its

* Chamberl. 191.

use is now in the decline, though the late Dr. Cullen esteemed it a salutary potation, in a moist and variable climate. The prodigious consumption of tea is another peculiar feature, the use of that plant being rare in other European countries; to phlegmatic constitutions it may be beneficial, but among the common classes, its enervating powers are often attempted to be corrected by the use of spiritous liquors. The latter bane has been long known in Russia, and other northern kingdoms, but in the milder climes of Great Britain and Ireland, is destructive of the health and morals of the people. The legislature has been often forced to interpose to prevent the growth of drunkenness, wretchedness and vice; and it is to be wished, that a late committee of the house of commons had sanctioned a motion that was made to restrict spiritous liquors to their ancient boundaries, the shops of the chymists. It was objected, that by private distillation and smuggling, the evil would continue, without yielding any revenue; but the prohibition must have made a deep and salutary impression, and the contagion must have been restricted to far narrower bounds. In all events, it is the moral duty of the legislature to increase the price of spirits almost to prohibition, and to withdraw taxation from malt liquor, which ought to remain a stout and cordial beverage for the poor.

The simplicity of the English cookery, strikes foreigners as much as that of the dress, which, even among the great, is very plain, except on the days of court gala. A Frenchman drinks his wine during dinner, but the late Mr. Gibbon has remarked,* that the luxury of a daily table in England, permits a gentleman to taste half a dozen sorts of wine during dinner, and to drink his bottle of claret afterwards. The red wine of Portugal is, however, a greater favourite than that of France, as its astringent and antiseptic qualities, are found highly salutary in a moist climate. A late French traveller† has remarked, that the English know not the proper use of coffee; but will swallow several cups of brown water, instead of one cup of the real strong coffee, drank in other countries.

The houses in England are peculiarly commodious, neat, and cleanly, and domestic architecture, seems here arrived at its greatest perfection. The dress, as has been before observed, is rather plain and neat, than splendid, a praise which also applies to that of the ladies, who have now abandoned the tight form so prejudicial to health, and have assumed much of the Grecian ease and elegance.

The amusements of the theatre and of the field, and various games of skill or chance, are common to most nations. The baiting of bulls and bears is, it is believed, nearly discontinued; one of the most peculiar amusements of the common people, is the ringing of long peals, with many changes, which deafen those who are so unhappy as to live in the neighbourhood of the church.

Prior to the middle of the sixteenth century, the English and French were regarded as barbarous nations by the more polished Italians. The reign, and female blandishments of the court of Elizabeth, seem to have had a wonderful effect in civilizing the manners. The transi-

* Posth. Works. † St. Fond. Passim.

tion has been well pourtrayed by an ancient writer, whose simple language, given in modern orthography, may perhaps amuse the reader.

"There are old men yet dwelling in the village where I remain, who have noted three things that are marvellously altered in England within their sound remembrance. One is the multitude of chimnies lately erected; whereas in their young days there were not above two or three, if so many, in many of the uplandish towns of the realm, (the religious houses, and manor places of their lords, always excepted, and peradventure some great personages,) but each one made his fire against a *rere dosse* in the hall, where he dined and dressed his meat. The second is the great amendment of lodging; for, said they, our fathers, and we ourselves, have lain full oft upon straw pallets, covered only with a sheet, under coverlets made of *dagswain* or *hoptharlots*, (I use their own terms,) and a good round log under their heads, instead of a bolster. If it were so that our fathers, or the good man of the house, had a mattress or flock bed, and thereto a sack of chaff to rest his head upon, he thought himself to be as well lodged as the lord of the town, so well were they contented. Pillows, said they, were thought meet only for women in child-bed. As for servants, if they had any sheet above them, it was well, for seldom had they any under their bodies, to keep them from the pricking straws that ran through the canvas, and razed their hardened hides.

"The third thing they tell of, is the exchange of wooden platters into pewter, and wooden spoons into silver or tin. For so common were all sorts of wooden vessels in old time, that a man should hardly find four pieces of pewter, (of which one was peradventure a salt-seller,) in a good farmer's house; and yet, for all this frugality, if it may so be justly called, they were scarce able to live and pay their rents at their days, without selling of a cow, or a horse, or more, although they paid but four pounds at the uttermost, by the year. Such also was their poverty, that if a farmer, or husbandman, had been at the alehouse, a thing greatly used in those days, amongst six or seven of his neighbours, and there, in a bravery, to shew what store he had, did cast down his purse, and therein a noble, or six shillings in silver, unto them, it is very likely that all the rest would not lay down so much against it; whereas, in my time, although peradventure four pounds of old rent be improved to forty or fifty pounds, yet will the farmer think his gains very small, toward the midst of his term, if he have not six or seven years rent lying by him therewith to purchase a new lease; besides a fair garnish of pewter on his cupboard, three or four feather beds, as many coverlids, and carpets of tapestry, a silver salt-seller, a bowl for wine, if not a whole nest, and a dozen of spoons to furnish up the suit. This also he taketh to be his own clear; for what stock of money soever he gathereth in all his years, it is often seen that the landlord will take such order with him for the same, when he reneweth his lease (which is commonly eight or ten years before it be expired, since it is now grown almost a custom, that if he come not to his lord so long before, another shall step in for a reversion, and so defeat him outright,) that it shall never trouble him more than the hair

of his beard, when the barber hath washed and shaven it from his chin*."

This remarkable change in the reign of Elizabeth, was carried, as usual, to the opposite extreme; and the same author loudly execrates the contemporary luxury of attire. "I have met," says he, "with some in London so disguised, that it hath passed my skill to discern, whether they were men or women." He adds, "neither was it ever merrier with England, than when an Englishman was known by his own cloth; and contented himself with his fine *carsie* hose, and a mean slop (trowsers;) his coat, gown, and cloak, of brown, blue, or puce, with some pretty furniture of velvet or fur, and a doublet of sad-tawney, or black velvet, or comely silk; without such garish colours as are worn in these days, and never brought in but by the consent of the French, who think themselves the gayest men, when they have most diversity and change of colours about them."

Under this division of geography have been generally arranged what are called national characters, but which, in fact, are commonly monuments of prejudice and injustice, and particularly noxious to the minds of youth. It shall, therefore, only be remarked, that the cold restraint which some foreigners have ascribed to the English, has been candidly judged by a recent voyager†, to exist only in appearance. A more genuine attribute to the English is integrity, which has carried their credit and commerce to an extent before unknown in the history of nations.

LANGUAGE. Most European languages are derived from the Gothic or the Latin. To the Latin origin belong Italian, French, and Spanish; to the Gothic, the German, Dutch, Flemish, Danish, Swedish, and Norwegian. From the situation of the country, and other causes, the English participates of both those grand sources; and unites in some degree the force of the Gothic with the melody of the Latin dialects. The ancient ground, and native expression, originate from the Gothic divisions of the Belgic, Saxon and Danish; but particularly from the Belgic, as will appear from comparison with the Dutch and Frisic. The languages of Latin origin, have, however, supplied a vast wealth of words, sometimes necessary, sometimes only adopted because they are more sonorous, though not so emphatic as the original Gothic. There is no evidence of the existence of Celtic words in our language, whatever some antiquaries have imagined, for the words they indicate may also be found in Iceland, a country never peopled by the Celts.

Numerous manuscripts exist, written in the Anglo-Saxon, or Old English language, and one of its most classic authors, is the great Alfred himself. It appears from many works, written long after the conquest, that the French language, though colloquial among the great, scarcely imparted any tinge to the national tongue. The conquests of Edward III, in France, and other circumstances not proper to be here discussed, effected in the fourteenth century, a change in vain attempted by the Norman conqueror. Chaucer, who wrote at

* Description of Britain, in Holingshed's Chronicle, vol. i. fol. 85.

† St. Fond, tom. i. p. 61.

that period, presents almost the first rude dawn of what may be termed the English language. In the same century, that enterprising traveller, Sir John Mandeville, supplies one of the first specimens of English prose: as he was a man of some science for that time, has interspersed several words of Latin origin; and his book was much adapted to public curiosity, he may with some justice be regarded in the new light of a father of the English language. Gower, the poet, rather preceded Chaucer; and serves to evince, that Chaucer did not introduce any innovations, but, as may well be supposed, wrote in the language of his time.

In the succeeding century, the speech had made such rapid advances, that even as early as the reign of Henry VI, we find it vary very little from that of the reign of Henry VIII. There are papers preserved by Rymer and others, written in the reign of Henry VI, and composed with a force and precision which may appear surprising. The works of Fortescue, in the following reign of Edward IV, are not only dictated by excellent sense; but, setting aside the orthography, might even be perused by the common reader.

In the reign of Elizabeth, a century after, the English language had acquired such copiousness, dignity, force, and melody, that, perhaps, in the eye of very distant posterity, moderns may be supposed never to have exceeded; what is gained in elegance, being generally lost in power. Sidney's defence of poesy, may be regarded as a good specimen of English prose; not to mention Hooker's Ecclesiastical Polity, and other large works of that period, which continue to be read and admired. The common translation of the bible, is a noble specimen of the dignified prose of the following reign; beyond which it is unnecessary to conduct this sketch, as our libraries abound with the succeeding publications.

The construction of the English language is peculiar, and renders the study of it very difficult to foreigners. The German, and other Gothic dialects, presents declensions of nouns, and other correspondencies with the Latin; while in the English all such objects are accomplished by prefixes. Anomalies also abound, and are too deeply rooted, ever to be eradicated by grammatical rules. Further remarks would be foreign to the plan of this work, which however requires occasionally short specimens of the various languages of the globe, to enable the reader to judge of the relative origins of nations: for this purpose the Lord's prayer is generally chosen, which shall here be given in Anglo-Saxon, and in modern English.

Uren fader thic arth in Heofnas. Sie gehalgud thin noma. To cymeth thin Ryc. Sie thin willa, sue is in Heofnas and in eortho. Uren hlaf oferwistlic fel us to daeg. And forgeve us fcylda urna sue we forgefan scyldgum urum. And no inlead usig in custnung. Ah gefreig usich from ifle. Amen.

Our father which art in heaven, hallowed be thy name; thy kingdom come; thy will be done on earth as it is in heaven; give us this day our daily bread, and forgive us our debts as we forgive our debtors; and lead us not into temptation, but deliver us from evil. Amen.

LITERATURE. English literature is a vast and inviting theme, but a few fugitive remarks must here suffice. Of the traditionary

verses of the Druids, no relic probably exists; and the Roman conquest does not appear to have inculcated letters with much diffusion, for while we have classical writers of almost every other European kingdom, subdued by that great nation, of France, Spain, and even of Africa; no author of those periods claims a British origin. The country was seized by the Saxons before British literature faintly dawned in Gildas, A. D. 560. Irish literature commences about the same period, and continued for some centuries, to supply numerous writers in the Latin language, while England remained almost destitute. But Beda, in the eighth century, redeemed this defect, in himself a host, and like Chaucer, the wonder of his time. The Danish invasions were ruinous to literature, both in Great Britain and Ireland, and the great Alfred was obliged to exert his utmost endeavours, in order to restore some degree of learning, even among the clergy. That admirable prince did not aspire to Latin composition, but translated some works of merit and utility, as the histories of Orosius and Beda, into the Anglo-Saxon. Asserius is perhaps the only Latin writer, who can be named between the age of Bede and the year 1100, if we except a few lives of Saints: but the Saxon Chronicle is a noble and neglected monument of this interval, which being the only civil History of England, for a space of 400 years, ought to be carefully collated with all the manuscripts, and published with all the splendour of typography. About the year 1100, English literature commences a firm and steady pace. A numerous train of historians, poets, and other writers, fills the pages of biography. In the fourteenth century, Roger Bacon aspires even to the praise of eminent genius. In the following century, the civil wars between the houses of York and Lancaster, were destructive of literature and the arts; nor will it be easy to name an illustrious author of that period; but the introduction of painting in the reign of Edward IV. forms a memorable epoch. The writers of the sixteenth, and following centuries, are numerous and well known.

On a comparative view of European literature, it may be observed that the Italians, its first restorers, excel in poetry, history, and other departments of the Belles Lettres; but about the year 1600, their taste began to decline, and a mental effeminacy arose, which is conspicuous in the fantastic societies and academies, and in the extravagant flatteries which every writer thought due in politeness to another; the term *illustrious* becoming as familiar as that of *Signior* and *Madama*, a waste of literary fame, which rendered it of no value. The French even originally excelled in romance and light poetry, and that pleasing and minute species of biography, called memoirs; they have produced few works of original genius, but yield to no nation in scientific productions, and in literary disquisitions, written with good sense, precision, and accuracy. Spanish literature forms a vast treasure, little known to other nations; and scarcely any department can be named, in which excellent writers do not appear. The native German, Danish, and Swedish literature is but of recent celebrity. To complete the sole intention of this parallel, the grand feature of English literature, is original genius, transmitted even from Roger Bacon, to our Shakspeares, Miltons, Newtons, and Lockes; not to dwell here on claims

more minute, but equally firm. In the scientific departments, England must yield to France, except in the various branches of mathematical knowledge, the institution of the Royal Society, and the genius of Newton, having attracted the greatest talents within their sphere, to the neglect of other departments of curious investigation. The English clergy, who far exceed in learning any other body of that description in Europe, have always cultivated classical literature, with distinguished zeal and predilection.

An old writer observes, that during the civil war under Charles I, there were "more good, and more bad books, printed and published in the English tongue, than in all the vulgar languages of Europe*." Perhaps Germany may now exceed our literary efforts; yet more novels are supposed to be published in England in one month, than in all the rest of Europe in a year. Our literary journals, in which we may also claim a great degree of excellence, may indicate to foreigners, the vast extent of modern English literature.

The present state of the arts in England, is worthy of so opulent and refined a country, and the progress has been rapid beyond example. The late Horace Walpole, Earl of Orford, has delineated from the papers of the industrious Vertue, a pleasing and animated picture of the history of the arts in this country. Some faint traces of painting occur in the thirteenth century; but the names and country of the artists do not appear, except that of William of Florence, where the art had faintly begun to revive. In the reign of Edward I, the magnificent castles built in Wales, attest the genius and skill of the architects, while their individual fame is lost in obscurity: and towards the end of the fourteenth century, rich monuments of architecture and sculpture, are interspersed with some few remains of painting. The Missals in particular, and other manuscripts, begin to be illuminated or adorned with miniature paintings of great lustre; and as the Gothic architecture is by some conceived to have originated from the shrines for relics, so the larger paintings seem mere amplifications of the manuscript miniatures. But while the neighbouring Flanders began to display many native names, England continued, till the last century, to import her chief painters from abroad, as Holbein, Antonio More, Zucchero, Jansen, Mytens, Rubens, Vandyke, Lely, Kneller, &c. &c. Yet in miniature and engraving, there were excellent native artists in the seventeenth century; and in the beginning of that century, an eminent native architect, Inigo Jones. In the beginning of the eighteenth century, even the noble architecture of St. Paul's, did not redeem the other arts from great decline, till Hogarth instituted examples of ethic and characteristic painting, which have deservedly excited the admiration of Europe. His fame as an artist has been eclipsed by his inventive genius, but his pictures of Marriage a-la-Mode, and many others, are finished with a care, minuteness, and harmony, worthy of an eminent Dutch master. The present reign has not only been distinguished by patronage of the arts, but been fortunate in exuberance of artists of deserved reputation. To enumerate the living might be invidious, or occasion suspicions of partiality, but among the de-

* Chamberl. 191.

ceased may be named Sir Joshua Reynolds, eminent in history and portrait, and by his scientific disquisitions on the art; Gainsborough and Wilson in landscape, &c. &c. Though in the seventeenth century, Faithorne, and one or two others, shewed great skill and spirit in engraving on copper, yet our chief artists, even in the eighteenth century, were French, till the national fame was raised by Strange, Woollet, Worlidge, and others, who have been succeeded by such a number of excellent artists in this department, that England excels every country, and the prints executed in London attract universal admiration and imitation. Architecture and Sculpture now also boast of many distinguished native names; but in music we still revere the superior skill of the Germans and Italians, though our masters far excel those of any other country, and France in particular, where, however, the horrible discords fashionable for 200 years, begin at length to yield to the German and Italian taste.

EDUCATION. In a view of any country, education forms one of the most important topics, as its consequences extend to the essence and well-being of the community. The education of the lower classes in England, had become extremely neglected, before the benevolent institution of the Sunday Schools. There can be no doubt that where the common people are the best instructed, there they will be found the most quiet, contented and virtuous; as they feel a conscious self-respect, are accustomed to be treated with regard by each other, and will cheerfully extend the same reverential conduct towards their superiors in the favours of fortune. Political theories, being founded merely on analogical reasoning, and no two cases, climes, nor countries, being precisely similar, they become very hazardous in experiment; but a practical estimate of the advantages of general education, may be formed by comparing the neglected peasantry of Ireland, with the peaceable Highlanders of Scotland, where public schools exist in every parish. The middle and higher ranks of English, spare no expense in the education of their sons, by private tutors at home, or at what are called day schools and boarding schools. The former kind in which the master only attends to mental culture, seems preferable to the latter, which requires additional cares of the child's health, diversions, and conduct. Our most eminent public schools, are those of St. Paul's, Westminster, Eton and Winchester; and from them have arisen some of the most distinguished ornaments of their country.

UNIVERSITIES. The scholars in due time proceed to the universities of Oxford and Cambridge, foundations of an extent and grandeur that impress veneration. The number and æra of the colleges will appear from the following list:

UNIVERSITY OF OXFORD.

1263. Baliol College....Founder, John Baliol, (father of John, King of Scotland,) and his wife Dervorgilla, Countess of Galloway.

1276. Merton College....Walter Merton, Bishop of Rochester.

1292. University College....William, Archdeacon of Durham*.
1316. Exeter College....Walter Stapleton, Bishop of Exeter.
1323. Auriell College....Adam de Brome, Almoner to Edward II.
1340. Queen's College....Robert Eglesfield, Chaplain to Queen Philippa.
1379. New College....William of Wickham.
1438. All Souls....Archbishop Chicheley.
1458. Magdalen College....William of Wainfleet.
1513. Brazen Nose....William Smith, Bishop of Lincoln.
1516. Corpus Christi...Richard Fox, Bishop of Winchester.
1539. Christ's Church ...Wolsey and Henry VIII.
1556. Trinity College....Sir Thomas Pope.
1557. St. John's....Sir Thomas White.
1571. Jesus College....Dr. Price.
1613. Wadham....Nicholas Wadham, Esq.
1624. Pembroke....Thomas Tesdale, Esq†.

There are besides several halls, or smaller colleges, and some recent foundations. The laudable favour of the Oxonians, adores Alfred as the founder of what is called the University College, and even assigns the date of 886; but candid antiquaries assert, that the passage in one or two old Chronicles, alleged in support of this idea, is a manifest interpolation, not to be found in the best manuscripts: and though great schools of divinity may have previously existed at Oxford, such were also known at other places, which lay no claim to the title of university.

UNIVERSITY OF CAMBRIDGE.

1284. Peter-house....Hugh Balsham, Bishop of Ely.
1340. Clare-hall....Elizabeth de Burg, Countess of Ulster.
1347. Pembroke-hall....Mary de Valentia, Countess of Pembroke.
1348, and 1557. Gonville and Caius....The Doctors so named.
1353. Trinity-hall....William Bateman, Bishop of Norwich.
1356. Bennet, or Corpus Christi....Henry Duke of Lancaster.
1443. King's College....Henry VI.
1446. Queen's College....Margaret of Anjou.
1474. Catharine-hall....Dr. Woodlark.
1497. Jesus College....John Alcock, Bishop of Ely.
1516. Christ's College.... } Margaret, Countess of Richmond, Mother of
1511. St. John's.... ..... } Henry VII.
1520. Magdalen College....Thomas, Lord Audley.
1546. Trinity College. ..Henry VIII.
1589. Emanuel....Sir Walter Mildmay.
1588. Sydney College....Frances Sydney, Countess of Sussex‡.

Of the two universities many minute descriptions have appeared. Oxford is the more majestic, from the grandeur of the colleges, and other public buildings, and the superior regularity and neatness of the streets; but the chapel of King's college, at Cambridge, is supposed to excel any single edifice of the other university. Both of those mag-

* Gough's Cam. I. p. 302, &c. † Ibid. ‡ Ibid. II. 124. 131. Gray's Poems, Notes.

nificent seminaries impress every feeling mind with reverential awe, not only by their architectural dignity, but by a thousand collateral ideas of ancient greatness and science.

To attain the degree of bachelor of arts, a residence of twelve terms, or three years, is necessary at Cambridge, four at Oxford. In both universities, three years more must elapse, before the student can commence master of arts; after which seven years are required before he can become bachelor of divinity: and four more for the doctor's degree. That of doctor of laws may be acquired in seven years after he is declared master of arts.

Female education is conducted in England with great elegance and expense. Even in the middle ranks of life, young women are generally taught music and drawing, a plan which surprises foreigners, who seldom teach these arts, except in cases of decided propensity. They are, indeed, of little or no use in future life; but they enlarge and cultivate the mind, and serve to prevent the dangers of idleness.

Cities. In giving a brief account of the chief cities and towns in England, a few of the most important shall be arranged according to dignity, opulence, and population; and the others shall be stated without preference, in a kind of progress from the south-west to the north.

London. London, the metropolis of England, and perhaps the most populous and rich city on the face of the globe, is situated in an extensive plain or valley, watered by the Thames, and only confined on the north by a few small elevations; being a place of great antiquity, and first mentioned by Tacitus. It was in former times of far less extent, and surrounded with walls, but now includes Southwark, in itself a city, on the other side of the Thames, and Westminster, another city on the west; so that like some places of ancient geography, it might be named *Tripolis*, or three cities. The noble river Thames is here about 440 yards in breadth, and is crowned with three bridges, the most ancient of which was formerly covered with houses and shops, now removed; but the inconveniences it presents to navigation, cannot be so easily remedied. The Thames is crowded with a forest of masts, and conveys into London the wealth of the globe, forming an excellent port, without the danger of exposure to maritime enmity. It is, however, a great defect, that instead of open quays and streets, on the banks of the stream, the view is obstructed, on both sides, by irregular masses of building, which do not even admit of a path. London presents almost every variety which diversifies human existence; upon the east is a sea-port replete with mariners, and with the trades connected with that profession. In the centre it is the seat of numerous manufactures, and prodigious commerce; while the western, or fashionable extremity, presents royal and noble splendor, amidst scenes of the highest luxury, and most ruinous dissipation.

Few cities can boast a more salubrious situation, the subjacent soil being pure gravel, by which advantage, united with extensive sewers, the houses are generally dry, cleanly, and healthy. Provisions and fuel are poured into the capital, even from distant parts of the kingdom, the latter article being coals, from the counties of Northumber-

land and Durham, transferred by sea, and thence denominated sea-coal*. The smoke is esteemed to purify the dampness of the air, but injures the beauty of the edifices; the sublime architecture of St. Paul's, for instance, being obscured by sable weeds. London requires in one year 101,075 beeves, 707,456† sheep, with calves and pigs in proportion; the vegetables and fruits annually consumed in the year, are valued at a million sterling‡.

The population of London has by some been exaggerated to a million of souls; but by the most recent and authentic accounts, it does not contain above six hundred thousand. Its length from Hyde-park corner on the west, to Poplar on the east, is about six miles; the breadth unequal, from three miles to one and less; the circumference may be about sixteen miles. The houses are almost universally of brick, and disposed with insipid similarity; but in recompence, most of the streets are excellently paved, and have convenient paths for foot-passengers, a mark of respect to the common people, almost unknown to the capitals on the Continent. Another national feature, is the abundance of charitable foundations, for almost every infirmity and distress, incident to human nature. The multitude and rich display of the shops impress strangers with astonishment, nor are they less surprised at the constant torrent of population rolling through the principal streets, nor at the swarm of carriages at all times crowding all the roads to the capital, and the nocturnal illuminations which extend even to four or five miles of the environs. Though the impression of the tide be felt as far as Staines, the Thames at London, and a considerable way below, is untainted with salt. Its waters are raised by machinery, and conducted in innumerable pipes for domestic uses, while the parts more remote are supplied with water from some small ponds near Hampstead, and from that laudable work of Middleton, the New River, which conveys a copious addition from the north. The water of the Thames is said to impart peculiar qualities to the liquor called porter; but this idea perhaps only tends to strengthen the monopoly of the London brewers.

The environs of London present a spectacle almost as grand and interesting as that of the metropolis itself. Extensive streets of villas and houses, are continued in almost every direction, within seven or eight miles. Yet few of the public edifices in London can pretend to much magnificence. The cathedral of St. Paul's forms one of the chief exceptions; the exterior architecture of this principal cathedral of the Protestant faith, being majestic to a degree of sublimity, but the interior is defective in decoration. The tombs recently ordered, in imitation of those at Westminster, will contribute to obviate this remark. In the colonnade, fountains, &c. it yields to St. Peter's at Rome; and, in general, the public edifices of London are in disadvantageous positions, without proper avenues or points of prospect. It is surprising that fountains, or jets d'eau, which so much diversify the

* Mr. Middleton, in his View of Middlesex, 1798, supposes that half a million of chaldrons are yearly consumed in that county.

† Ibid. 411. ‡ Ibid. 267. Mr. Pennant, Brit. Zool. iv. 9. says, 60,000 lobsters are annually brought to London, from near Montrose.

ornaments of a city, though in a garden they be puerile, should be almost unknown in London, except a diminutive specimen in one of the courts of the Temple. Westminster-abbey may claim the next rank to St. Paul's cathedral, being not only in itself a grand impressive edifice, of the Gothic class, but as being the sanctuary of the illustrious dead, of all ranks, periods, and professions, from the victorious monarch down to the humble pedagogue. It was founded by Sebert, King of the East Saxons; was afterwards ruined by the Danes, and refounded by Edward the Confessor, whose tomb is the most ancient now remaining. The present edifice was the work of Henry III; and Henry VII added an elegant chapel, and his tomb, the work of Torrigiano; in the vaults under this chapel the late monarchs and their offspring have been deposited. The body of the edifice is crowded with illustrious tombs, decreed by the nation, or erected at the expense of individuals; this part is open to general inspection; and others more retired, are displayed by the attendants for a trifling remuneration. Adjacent are the two houses of parliament, and Westminster-hall, a vast room, 230 feet long, and 70 wide, with a curious ceiling of Irish oak, and apartments on the side, in which are held the principal courts of justice.

The churches and chapels exceed 200 in number, and a few are of beautiful architecture. Some are the productions of Inigo Jones; as is also the noble banqueting-house at Whitehall, with a masterly ciel ing painted by Rubens, representing the apotheosis of James I.

Near London bridge, a pillar of 193 feet elevates his bold front above most of the spires, and is called the Monument, being destined to commemorate the conflagration of London, in the reign of Charles II. The tower is only venerable from ancient fame; and remarkable for the curiosities which it contains. The new edifice erected by the Company trading to the East Indies, has a considerable degree of elegance, and some of the halls of the companies have a respectable appearance. The Bank is a structure of the Ionic order, more remarkable for intrinsic wealth than exterior magnificence. The architecture of the prison called Newgate is singularly appropriate. Somerset House presents an elegant specimen of recent architecture, but may, perhaps, in future times be found as deficient in solidity as it is at present inconvenient in the height and steepness of the stairs, and in some other respects. The terrace of the Adelphi is a pleasing piece of architecture, and presents an interesting prospect of the river. The Pantheon is an elegant edifice, resembling that at Rome, but dedicated solely to public amusements. The royal palace of St. James's is an irregular building, of very modest aspect. The queen's palace, formerly Buckingham-house, only aspires to elegant convenience, but contains some valuable paintings, and an excellent library, formed solely by the taste of the reigning monarch. The palace of Kensington presents an exuberance of valuable pictures, little known, and rarely visited. The houses in the west end of the town, of themselves shew the gentle gradations of rank in England, those of the chief nobility being rarely distinguishable from the others; the more remarkable are, Foley-house, the Duke of Manchester's; the late Mrs. Montague's, in Portman square; Chesterfield-house; Lord Spencer's, in

the Geeen-park; Marquis of Lansdown's, Berkeley-square; Duke of Northumberland's at Charing-cross; Burlington house, with a fine colonnade behind the front wall, and those of the Duke of Devonshire and the Earl of Bath, all in Piccadilly; nor must Cumberland-house and Carleton-house, in Pall-Mall, be forgotten.

York. Next to the capital in dignity, though not in extent nor opulence, is York, which is not only the chief city of a large and fertile province, but may be regarded as the metropolis of the north of England. The name has been gradually corrupted from the ancient Eboracum, by which denomination it was remarkable even in the Roman times, for the temporary residence and death of the Roman Emperor, Severus. This venerable city is divided by the river Ouse; and the Gothic cathedral is of celebrated beauty, the western front being peculiarly rich, the chief spire very lofty, and the windows of the finest painted glass. York divides with Edinburgh the winter visits of the northern gentry.

Liverpool. But Liverpool, in Lancashire, is now generally allowed to approach the nearest to London in wealth and population, being the seat of a vast commerce, which has been continually on the increase, since the beginning of this century, when it was merely a village. It is first mentioned in the reign of William the Conqueror; yet in Leland's time, was not even a parish, but had only a chapel, the parish-church being that of Walton. In 1699, Liverpool was admitted to the high honour of being constituted a parish. In 1710 the dock was constructed; and the chief merchants came originally from Ireland, a circumstance which has given a distinct tinge to the manners of the town. Thenceforth the progress was rapid, and in 1760 the population was computed at 25,787 souls*. In 1773 they amounted to 34,407, in 1787 to 56,670; at present they may be computed at between 70 and 80,000.

The number of ships which paid duty at Liverpool, in 1757, was 1371; in 1794 they amounted to 4,265. In the African trade, a distinguishing feature of Liverpool, there was only one ship employed in 1709; in 1792 they amounted to 132, It was computed that between the end of August 1778, and that of April 1779, Liverpool sent out no less than 170 privateers†. In the recent act for the contribution of seamen to the royal navy, according to the ships registered in each, the estimate is as follows:

London,	5725	Hull,	731	Bristol,	666
Liverpool,	1711	Whitehaven,	700	Whitby,	573
Newcastle,	1240	Sunderland,	669	Yarmouth,	506

Bristol. Bristol is still a large and flourishing city, though much of its commerce with the West Indies and America have passed to Liverpool. This metropolis of the west of England gradually rose to eminence in the Anglo-Saxon period; and was so flourishing and opulent in the reign of Henry II, that, besides other charters, he granted the possession of Dublin in Ireland; and a colony from Bristol

* Aikin's Man. 333. et seq. † Ibid. 364, 371.

was accordingly transplanted*. The trade with Ireland has continued chiefly to center in this city: even in that reign, as ancient writers inform us, the port of Bristol was replete with vessels from Ireland, Norway, and other parts of Europe. Bristol is pleasantly situated at the confluence of the Froome with the Avon. Besides the cathedral, there is a large church of Gothic construction, that of Redcliffe, founded in the thirteenth century, and improved and repaired by Canyng or Canyngs, an opulent merchant of the fifteenth century, celebrated by William of Worcester†. In the treasury room of this church, is an ancient chest, the source ascribed to several literary forgeries. The hot-wells in the neighbourhood appear to have been known in 1480; but the water was chiefly used externally, till about the year 1670, when a baker dreaming that his diabetes was relieved by drinking the water, he tried the experiment, and recovered‡. Since that period its reputation has increased, and many commodious and elegant erections have contributed to recommend these wells to invalids. In the adjacent rocks are found beautiful crystals, which before the introduction of artificial gems, were greatly in fashion for female ornaments. The trade of Bristol is chiefly with Ireland, the West Indies, or North America, Hamburgh, and the Baltic; that with Guinea, not the most laudable, is resigned to Liverpool. By the navigation of the two rivers Severn and Wye, Bristol also engrosses most of the trade of Wales. In 1787, Bristol employed about 1600 coasting vessels, and 416 ships engaged in foreign commerce‖. Inhabitants about 80,000.

BATH. The proximity may here authorise the mention of Bath, esteemed the most elegant town in England. The hot-baths, from which it derives its name, were known in the Roman times, nor was their celebrity lost even in the dark period of Anglo-Saxon history. But the town has been greatly enlarged and decorated in the last century. The waters are used both internally and externally, chiefly in gouty, bilious, and paralytic cases, being frequented at two times in the year, what is called the spring season, from April to June, and the autumnal from September to December. Two thirds of the company are attracted merely by amusement, society, and dissipation, in all which it is only second to London. Situated in a vale, Bath is very hot in summer. The houses are constructed of white stone, which abounds in the vicinity.

But next to Bristol in point of opulence, must be classed the towns of Manchester, Birmingham, and Sheffield.

MANCHESTER. Manchester, in Lancashire, was known in the Roman times under the name of Mancunium, a small Roman station; but it continued in obscurity till the time of Elizabeth¶; when Camden mentions its manufacture of woollen-cloths, then called *cottons*. During the civil wars under Charles I, Manchester remained in the hands of the Parliament. In 1708, the inhabitants were only computed at 8000. In 1757, they fell short of 20,000, at present they are supposed to amount to about 70,000. The cotton manufactures of Manchester are sufficiently known over Europe; and the machinery, greatly

* Barrett's Bristol, 49. 57. † Ibid. 573. 627. ‡ Ibid. 93. ‖ Ibid. 190.
¶ Aikin's Man. 149.

indebted to the genius of an Arkwright, excites astonishment at the progress of human art and industry*.

BIRMINGHAM. Birmingham, in Warwickshire, was originally a village, belonging to a family of the same name, whose monuments remain in the old church. Leland mentions it as a town inhabited by smiths and cutlers, in the time of Henry VIII; and by lorimers, now called bit-makers. The extension and improvement of Birmingham originated in a great degree from Mr. John Taylor, who introduced the manufacture of gilt buttons, and japanned and enamelled works; but the toy manufacture was known in the reign of Charles II. The great fabric, called Soho, belonging to Messrs. Boulton and Watts, is situated about two miles from Birmingham, but in Staffordshire. Between the year 1741 and 1790, Birmingham had received an augmentation of 72 streets, 4172 houses, and 2332 inhabitants†: the present population is computed at 60,000.

SHEFFIELD. Sheffield, in the most southern part of Yorkshire, is styled by Leland the chief market-town in Hallamshire, (for in the North, many particular districts usurp the name of shires.) The company of cutlers of Hallamshire, was established by act of parliament in 1625: but Sheffield had been distinguished for a kind of knives, called whittles, and other articles of cutlery, as early as the thirteenth century; yet, till within the last half century, the manufactures of Sheffield were conveyed weekly to the metropolis, on pack-horses. In 1751, the river Don was rendered navigable to within two miles of the town, which facilitated the export. The plated goods commenced about 1758. In the year 1615, the population only amounted to 2152; in 1755 to 12,983; in 1789 about 30,000. At present the population may be about 45,000‡.

The other chief towns in England, not aspiring to such pre-eminence, though several be of far more importance than others, shall be classed, as before mentioned, in a kind of geographical order, beginning at the south-west, and proceeding to the north.

FALMOUTH. Falmouth, in Cornwall, the most westerly port in England, is chiefly remarkable for the arrival and dispatch of packet boats; but Exeter, in the adjacent county of Devon, is an ancient and respectable city.

EXETER. Exeter is the seat of an extensive commerce in coarse woollen goods, manufactured in a part of Somersetshire, and in Devon and Cornwall||. They are exported to Italy, and other parts of the Continent, to the annual value, as is supposed, of 600,000*l*, and the East India Company purchase yearly to a considerable amount. Besides the native wool of the above-mentioned counties, Exeter imports from Kent about 4000 bags a-year. Some ships are also occupied in the cod-fishery of Newfoundland, and in the Greenland capture of whales. The imports are from Spain, Italy, Hamburgh, and the Baltic; and coals from the north of England and Wales. It is, moreover, the residence of many genteel families; and the frequent resort of others from the neighbouring counties.

* Aikin's Manchester, 149. 156.
† Hutton's Hist. of Birmingham.
‡ Aikin's Man. 539. et seq.
|| Aikin's Engl. Delineated, p. 335.

DORCHESTER. Dorchester, the chief town of the county of Dorset, is a place of considerable antiquity, situated on the river Frome; but has no manufactures, and is only celebrated for its malt liquor.

SALISBURY. Salisbury, the principal town of Wiltshire, is chiefly remarkable for extreme neatness, and for its cathedral, a beautiful piece of Gothic architecture, with the loftiest spire in England, the height being 400 feet. There is a manufacture of flannels, and another of cutlery goods and hardware, the superiority of the scissors being particularly noted. Wilton, in the same county, is famed for the manufacture of beautiful carpets.

WINCHESTER. Winchester, the chief city of Hampshire, was, for many centuries, the metropolis of England, a pre-eminence which it did not wholly lose till the thirteenth century*. The port was Southampton, but the superior safety and convenience of that of London, gradually restored the latter to that metropolitan dignity which it held in the Roman period. Winchester remains a venerable city, with many vestiges of ancient fame and splendor. It is situated in a bottom, amid open chalky downs, upon the small river Itchyn. The cathedral rather impresses the idea of majestic gravity, than of magnificence; and has no spire, having been erected before that mode of architecture was used. The ashes of several Saxon monarchs are here preserved with reverence. Not far from the cathedral stands the celebrated college, founded by William of Wickham, and which has sent forth many illustrious characters. The regulations of this school are, in some instances, peculiar and severe; but in this, and the other grand English seminaries, the equality of the pupils, except in respect of age and abilities, and even the subserviency in which the younger are held by the elder, tend to steel and fortify the mind against the subsequent cares and emulations of life. In the center of the city is a small, but most elegant Gothic cross; and at the western extremity is the shell of a palace, built under the direction of Sir Christopher Wren, yet heavy and inelegant; it was begun by Charles II, but left unfinished at his death. It has since been used for French prisoners, and in 1796 was the residence of about six hundred and forty emigrant priests from France.

PORTSMOUTH. In the same county is situated Portsmouth, the grand naval arsenal of England. The harbour is noble and capacious, narrow at the entrance, but spreading out into an inland bay, five or six miles in length, and from two to four in breadth. The advantages derived from nature have been improved by the art and industry of successive generations; and to a patriot, Portsmouth presents one of the most interesting scenes to be found in the British dominions. The regular fortifications towards the land, in themselves happily a novelty to the British eye: the magnitude and variety of the maritime objects and manufactures, and the prospect of Spithead, the grand focus of naval armament, conspire, with a thousand relative ideas concerning the power of England, supreme in every sea, to excite our astonishment and exultation.

* Milner's Winchest.

LEWES. Lewes is esteemed the chief town of Sussex; the situation is lofty and picturesque, especially the site of the ancient castle, belonging to the powerful Earls of Warren and Sussex. Beneath, in a pleasant plain, watered by the river Ouse, stand the ruins of an ancient nunnery.

BRIGHTHELMSTONE. Chichester retains some little traffic. Brighthelmstone is a fashionable resort for the sea air and bathing; an extensive beach extends four miles under lofty cliffs, and on the other side are wide open downs, composed of numerous verdant hills, diversified with winding cavities: towards Shoreham are some pits of a kind of bitumen, which might, perhaps, be used in some manufacture. When dried and rolled by the waves, it forms balls of various sizes, frequent on the beach, and formerly used as fuel by the poor, though since forbidden, on account of the noxious smell. Brighthelmstone not only presents the nearest open shore to the capital, but is distinguished for the peculiar mildness and salubrity of the air.

CANTERBURY. Canterbury, the chief town of Kent, and the metropolis of the English church, is chiefly remarkable for ecclesiastical antiquities; and the county town is Maidstone, noted for hops and thread. Kent presents many other important towns, as Deptford, Greenwich, Woolwich, Gravesend, Chatham, Rochester, and the fashionable resorts of Margate, Ramsgate, and Tunbridge. Dover and Deal are remarkable havens.

Having completed this brief survey of the chief towns to the south of the Severn and the Thames, those of the middle and northern counties may be again commenced from the west.

HEREFORD. Hereford, the capital of a county bordering on Wales, was known in the Saxon times as an episcopal see. The castle, supposed to have been founded in the reign of the Confessor, is on the left bank of the river Wye. The cathedral is large, but the town presents little remarkable, having gone into great decay: the only manufacture is that of gloves*.

GLOUCESTER. Gloucester, the capital of the county so called, is admired for the regularity of the four principal streets, joining in the centre of the town. It avails itself of the traffic of the Severn, which, among other fish, affords a luxurious supply of lampreys. This town has been recently celebrated for its neatness, and the cheapness of provisions.

WORCESTER. Worcester is also situated on the noble river Severn, over which there is a beautiful bridge. The manufactures are chiefly gloves and woollen stuffs; and the porcelain maintains a high reputation.

COVENTRY. On the east, the first town of note is Coventry, esteemed the most inland and centrical of the English towns, whence, perhaps, the military phrase of sending a man to Coventry, where he would be the most remote from service. The manufactures are chiefly ribbons, with a few gauzes and camlets. The beautiful cross, erected in 1541, after being much damaged by the lapse of years, has been taken down†.

* Gough's Camden, ii. p. 450. † Ibid. vol. ii. p. 346

NORWICH. The next memorable town is Norwich, the capital of Norfolk, from its size and consequence justly styled a city *. It is, however, not mentioned till the year 1004, when it was ruined by the Danes. The worsted manufactory is supposed to have been introduced here by the Flemings, in the twelfth century, and was followed by that of sayes arras, bombazeens, &c. Of late the damasks, camlets, crapes, stuffs, &c. here wrought, have been computed at the yearly value of 700,000*l.*; but the fashionable use of cottons, and the interruption of commerce by war, have considerably lessened the consumption. The wool is chiefly from the counties of Lincoln, Leicester, and Northampton; the chief exports to Holland, Germany, and the Mediterranean †. Norwich is of course opulent and extensive; but the streets are confined and devious.

YARMOUTH. Yarmouth is a noted sea-port, with a beautiful quay, and remarkable for its fisheries of mackarel in May and June, and herrings in October and November: the latter cured by salt, and dried in the smoke of wood, are called red-herrings, and, besides home consumption, form a considerable article of export to Spain and Italy.

LINCOLN. In proceeding northwards, Lincoln must arrest attention, though now much fallen from its former fame. The interior of the cathedral is admired for its lightness and magnificence. The sheep of the county form a celebrated breed, but the wool goes chiefly to Norwich. Lincoln trades in coals, imported on the Trent.

CHESTER. In a chorography of England, Leicester and Shrewsbury might deserve description, but its geography can only embrace the most important topics. The city of Chester must claim the next consideration. It is of Roman origin, and the chief streets are singular in their construction, being excavated beneath the level of the ground, while a covered portico, in the front of the houses, affords an elevated and sheltered foot-path; beneath are the shops and warehouses, on the level of the street, to which the passenger descends by occasional stairs. The trade of Chester is not considerable, but it carries on a share of the traffic with North Wales; and its two annual fairs are famous for the sale of Irish linens. It is the favourite residence of many genteel families from Wales ‡.

LANCASTER. Near an extensive bay of the Irish Sea, which might now be termed the bay of Lancaster, while antiquaries affect to retain the Roman name of *Moricambe*, stands Lancaster, an ancient and populous town. The name is in the north pronounced Loncaster, the proper etymology, as it stands upon the river Lon. When the counties of Cumberland and Westmoreland belonged to the Scots, this was regarded as a kind of frontier place, and was defended by a strong castle, situated on a commanding eminence. Lancaster afterwards gave the title of Duke to princes of the royal blood; and the contentions of the houses of York and Lancaster are well known. There is a bridge of five arches over the Lon, which opens into a considerable haven; the seat of a moderate commerce, especially with the West Indies.

* A Bishop's see constitutes a city. † Aikin, 216.
‡ Pennant's Tours. Aikin, 90.

HULL. On the East, the extensive province of Yorkshire contains many flourishing towns, besides the capital, York, and Sheffield, already described. On the Humber, the wide receptacle of many rivers, stands the great sea-port of Hull, or Kingston-upon-Hull; the latter name being only that of the rivulet. The town was founded by Edward I. Several privileges were obtained from Richard II; and the first staple of trade was stock-fish imported from Iceland. In the civil wars of last century, Hull displayed the first flag of defiance against the monarch. The harbour is artificial, and is supposed to present the largest dock in the kingdom. The trade is important with America, and the south of Europe, but chiefly with the Baltic; and several ships are employed in the northern whale-fishery. The coasting traffic is extensive in coals, corn, wool, and manufactories; and Hull supplies the commerce of many northern counties, having not only communication with the Trent, and other branches of the Humber, but with the rivers and canals of Yorkshire*.

LEEDS. Leeds, Bradfield, Halifax, and Wakefield, are the chief centres of the great manufactures of woollen cloths and stuffs. Leeds is the principal mart for broad-cloths, or what foreigners term fine English cloth. It is situated on the river Eyre, in an extensive vale; and the population is computed at sixteen thousand: the cloths are woven in the neighbouring villages, but are dyed, prepared, and sold, at Leeds. The cloth-hall appropriated to the sale is a vast edifice; and the whole business is transacted within the space of an hour on the market days. Halifax is in an elevated situation, and very populous. It is the chief market for the thinner woollen cloths, such as stuffs, calimancoes, &c. Scarborough, on the eastern coast, is a place of celebrated resort for sea-bathing, and the mineral water; the site is romantic, but the port is small, and chiefly frequented by fishing vessels.

DURHAM. Durham is a pleasant and venerable city, extending partly over an eminence; the river Were, winding around in the form of a horse-shoe renders it peninsular. Near the neck of land is placed the castle, of which little more than the keep remains; which is surrounded by the pleasant garden of the Bishop's adjacent palace. Towards the point of the peninsula stands the cathedral, a most august edifice, in a most august situation, with deep declivities on the south and west, down to the river; the banks of which are finely wooded, and rich in the wild beauties of nature, which have been improved, not injured, by the taste and opulence of the clergy. The bridge on the east is narrow and meanly executed; but on the south there is an elegant modern bridge; and on the west that of Bishop Flambard is admired for the lightness and beauty of the arches. About a mile from the town, on this side, stands Nevil's Cross, where David II, king of Scotland, was taken prisoner after a bloody conflict. The cathedral was built about the year 1004, at least the lower part, which belongs to what is called the Saxon form of architecture; and is now repairing at the expense of the Bishop and Chapter. Some branches of the woollen manufacture are carried on at Durham,

* Aikin, Engl. Delin. 56.

and a few elegant carpets have been lately made there in a kind of Mosaic form.

Stockton on the river Tees, Sunderland at the mouth of the Were, and South Shields on that of the Tyne, are sea-port towns in the bishopric, (for so the county of Durham is commonly styled in the north,) of considerable size, trade, and population. Hart-le-Pool is only a bathing-place.

NEWCASTLE. On the river Tyne stands Newcastle, so termed from a fortress erected by Edward I. This is a large and populous town, or rather city, placed in the centre of the grand coal-mines in the counties of Durham and Northumberland, which have for centuries supplied London and most of the east and south of England with that fuel; which has perhaps contributed more to the manufactures and commerce, and consequent wealth and power of this kingdom, than any other material or circumstance. The coal fleets sometimes amount to five hundred sail; their station is at Shields, and the quays of Jarrow and Willington. Even as a nursery of seamen the trade is invaluable*. In all parts of the neighbourhood are seen large carts, loaden with coals, and proceeding towards the port, on inclined planes, without the help of horses or men, to the great surprize of the stranger†. Near Newcastle are also found quarries of grind-stone; and many glass-houses smoke around, the productions of which have been recently of remarkable purity. Other exports are, pickled salmon, lead, salt, butter, and tallow. The suburb of Gateshead stands on the south of the Tyne, and is connected with the city by a grand bridge. The shops and crowded streets recal the idea of London; but the latter are generally narrow, steep, and incommodious.

CARLISLE. Berwick-upon-Tweed being on the Scottish side of the river, shall be reserved for the description of that country. The chief remaining town in England is Carlisle, the capital of the county of Cumberland, placed at the confluence of the rivers Pettril and Caldew with the Eden‡. The old fortifications remain nearly entire. It is supposed to have been the ancient Luguballia; but neither the castle nor cathedral are remarkable. The chief manufactures are linens, printed and checked, whips and fish-hooks. The town is little populous, and is chiefly memorable for transactions in the ancient wars between Scotland and England.

WALES,

A COUNTRY abounding in the sublime and beautiful features of nature, contains many towns of note; and the description of a few has been reserved to this place, for the greater clearness of arrangement.

* Gough's Camden, iii. 252.
† St. Fond, Voyage en Angl. i. 163.
‡ Gough's Camden, iii. 175. For the rivers, Housman 30.

CAERMARTHEN. Caermarthen, the capital of a county, is also regarded as the principal town in South Wales: it stands upon the river Towy, and was anciently defended by a castle now demolished. The haven is shallow, and the trade of course not very considerable*.

PEMBROKE. Pembroke, on a creek of Milford Haven, is a small town of little commerce.

CAERNARVON. Caernarvon is esteemed the chief town of North Wales, for the beauty of the situation, regularity of the streets, and above all for the grandeur of the castle, one of the most magnificent in Europe, founded by Edward I, in 1282. Here was born Edward II, surnamed of Caernarvon, who was immediately created the first English Prince of Wales, his father having equivocally promised to the vanquished Welsh a Prince born in their own country, and who could not speak one word of English. The town has a considerable trade with London, Bristol, Liverpool, and Ireland; and has a beautiful quay along the side of the Menai, a strait between North Wales and Anglesea†.

EDIFICES. In a brief enumeration of the principal edifices in England, the royal palaces demand of course the first attention. Windsor-castle, situated on an eminence, near the Thames, has an appearance truly grand, and worthy of the days of chivalry. The view extends as far as the cathedral of St. Paul's, and the whole scene strongly impresses the circumstances so vividly delineated in Gray's pathetic ode on Eton College. This palace contains many noble paintings, particularly the cartoons of Raphael. Hampton-court is in a low situation, ornamented with aqueducts from the river Colne. This palace is also replete with interesting pictures. The royal gardens alone remain at Richmond, but are totally eclipsed by those of Kew, which are truly worthy of a great and scientific prince; the ground, though level, is diversified with much art, and the collection of plants from all the regions of the known world, fills the admirer of nature with delight and surprize. They are so disposed, that every plant finds as it were its native soil and climate, even those that grow on rocks and lava, having artificial substitutes.

The royal palace at Greenwich has been long abandoned, but the observatory does credit to science. It is a plain edifice, well adapted to astronomical observations, and at present ably superintended by Dr. Maskelyne. Dr. Herschell's observatory, instead of containing his telescope, is suspended from it in the open air, at Slough, near Windsor; where he is continually extending the bounds of astronomical knowledge.

Among the houses of the nobility and gentry, or palaces, as they would be termed on the Continent, the first fame, perhaps, belongs to Stowe, the seat of the Marquis of Buckinghamshire, which, for its enchanting gardens, has been long celebrated. When Mr. Beckford's magnificent erections at Fonthill are completed, that fame will be far surpassed. The present intention, however, will be better accomplished by a brief view of the edifices, as they occur in the order of counties above arranged:

* Gough's Camden, ii. 504. 507. † Pennant's Wales, ii. 223. 227

Cornwall...Mount Edgecombe, Lord Edgecombe.

Devonshire...Powderham-castle.

Wiltshire...Wilton, Earl of Pembroke's; Fonthill, Mr. Beckford's; Longleate, Lord Weymouth; Wardour-castle; Stourton, Mr. Hoare's.

Hampshire...The Grange, Mr. Henley; the Vine, Mr. Chute.

Surry...Earl of Spencer's at Wimbleton; Farnham Castle, Bishop of Winchester; Oatlands, Claremont, Esher; Dulwich, Lord Thurlow.

Sussex...Arundel-castle, Duke of Norfolk; Goodwood, Duke of Richmond; Cowdray.

Kent...Knowle, Duke of Dorset; Penshurst, near Tunbridge, a famous seat of the Sydneys, &c. &c.

Essex...Wanstead, Earl of Tilney; Audley-end; Havering, Duke of Ancaster.

Middlesex...Sion-house, Duke of Northumberland; Osterly-park, Mr. Child; Holland-house, Lord Holland, &c, &c.

Bucks...Clifdon; Stowe; Bulstrode, Duke of Portland, &c. &c.

Oxfordshire...Blenheim, Duke of Marlborough; Ditchley, Earl of Litchfield; Newnham, Earl of Harcourt, &c.

Gloucestershire...Badminton, Duke of Beaufort; Berkley-castle, Earl of Berkley; King's Weston, Lord de Clifford.

Herefordshire...Aconbury, Duke of Chandos; Brampton Bryan, Earl of Oxford; Clifford-castle, Lord Clifford.

Worcestershire...Crome-court, Earl of Coventry; Hartlebury, the Bishop; Hagley, Lord Lyttleton. The Leasowes of Shenstone is in Shropshire.

Warwickshire...Tamworth-castle, Earl Ferrers; Warwick-castle.

Northampton.....Althorp, Earl Spencer; Easton, Earl of Pomfret; Burleigh, Earl of Stamford; and Apthorp, Earl of Westmoreland.

Bedfordshire...Wooburn-abbey, Duke of Bedford; Luton, Marquis of Bute.

Hertfordshire...Hatfield, Earl of Salisbury; Moore-park, Lord Dundas.

Huntingdonshire...Kimbolton-castle, Duke of Manchester; Bugden, Bishop of Lincoln.

Cambridgeshire...Thorney-abbey, Duke of Beaufort; Maddingly, Sir John Cotton; Milton, Mr. Knight.

Suffolk...Euston-hall, Duke of Grafton; Broome-hall, Lord Cornwallis.

Norfolk...Houghton, Lord Cholmondley; Raynham, Lord Townshend; Holkham, Earl of Leicester.

Lincoln...Grimsthorpe, Duke of Ancaster.

Rutlandshire...Okeham and Burley, Earl of Winchelsea; Ashton, Earl of Cardigan.

Leicestershire.....Belvoir-castle, Duke of Rutland; Groby, Earl of Stamford.

Nottinghamshire....Nottingham-castle, Duke of Newcastle; Welbeck, Duke of Portland; Worksop, Duke of Norfolk.

Derbyshire...Chatsworth, Duke of Devonshire; Keddleston, Lord Scarsdale.

Staffordshire...Beau Desert, Earl of Uxbridge; Dudley-castle, Lord Dudley, &c.

Shropshire...Okeley-park, Lord Clive; Atcham, Lord Berwick, &c.

Cheshire...Cholmondley-hall, Earl of Cholmondley; Eaton-hall, Earl of Grosvenor.

Lancashire...Stonyhurst, Duke of Norfolk; Knowlsley, Earl of Derby.

Yorkshire...Sheffield manor, Duke of Norfolk; Wentworth-castle, Earl of Strafford; Wresel-castle; Castle Howard, Earl of Carlisle; Whalton-castle, Earl of Aylesbury; Hornby-castle, Earl of Holderness; Kiveton, Duke of Leeds, &c. &c.

Westmoreland...Pendragon-castle, Louther-hall, Lord Londsdale; Appleby, Earl of Thanet.

Cumberland....Greystock-castle, Duke of Norfolk; Naworth, Earl of Carlisle.

Durham...Raby-castle, Earl of Darlington; Bishop of Aukland, Bishop of Durham; Lumley-castle, Earl of Scarborough; Hilton-castle, &c. &c.

Northumberland...Alnwick, Duke of Northumberland; Morpeth-castle, Earl of Carlisle, &c.

Wales abounds in elegant edifices, as Winstay, the seat of Sir William Watkins Wynn; Lord Bulkley's near Beaumarais; Duke of Beaufort's in Brecknockshire; Chirk-castle, in Denbighshire; Hawarden-castle, in Flintshire; Swansey and Cardiff castles, in Glamorganshire; Powis-castle in Montgomery; Picton-castle, in Pembrokeshire, &c. &c.

Among public buildings must not be omitted the noble hospitals for seamen and soldiers at Greenwich and Chelsea. Many of the county-halls have no inconsiderable claims to elegant architecture.

Bridges. The bridges are worthy the superiority of the English roads; and a surprising exertion in this department, is the recent construction of bridges in cast-iron, an invention unknown to all other nations. The first example was that of Colebrook-dale, in Shropshire, erected over the Severn, in 1779. This bridge rests on abutments of stone-work, the main rib consisting of two pieces, each 70 feet long, connected by a dove-tail joint, fastened with screws; the shorter ribs, cross-stays, braces, &c. &c. would be little intelligible without a delineation. The road over the bridge is made of clay and iron slag, 24 feet wide, and one deep; the span of the arch 100 feet 6 inches; height from the base line to the centre 40 feet; the weight of iron employed 378 tons 10 hundred weight*. Another iron-bridge has since been erected in the vicinity. A stupendous iron-bridge was thrown over the harbour at Sunderland, about five years ago; the height of which is 100 feet, and the span of the arch 236. The chief defect of the bridge at Colebrook was understood to be, that it formed one entire whole, incapable of partial repairs; but that at Sunderland is composed of detached pieces of cast-iron, which, if damaged in any of the parts, may be withdrawn, and replaced by others. It is supported between two strong and elevated stone piers; and the arch is surmounted at either end by vast hoops, supporting the platform, or passage of the bridge, which is thus rendered almost level. When viewed from beneath, the elegance, lightness, and surprising height, excite admiration; and the carriages appear as if passing among the clouds.

Several other bridges have been constructed on this new and singular plan, but not of sufficient importance to demand description, after such great examples. It is said to be in agitation to throw similar fabrics over the Thames, at Staines and Datchet. Many projectors have eagerly contended for the rebuilding of London bridge; if cast-iron were employed, it would be more commodious for navigation, and would impress the beholder with astonishment, at the unrivalled pomp and grandeur of English manufactures.

Inland Navigation. This article is important to the best interests of the country, and demands particular attention. It is believed that what is called the Caerdyke, extending from the river Nyne, a little below Peterborough, into the river Witham, three miles below Lincoln, was intended for inland navigation: this canal is about forty

* Gough's Camden, ii. 417.

miles in length, and must have been originally very deep, though now almost filled up*. It is supposed to have been a work of the Romans. No trace of further exertion in this department appears, till the year 1608, when the canal, or rather aqueduct, called the New River, was projected and begun by Sir Hugh Middleton: it was finished in five years, and winds through a long course from Ware in Hertfordshire, to the grand cistern of Islington. But in fact, the earliest inland navigation that can be authenticated, is the Sankey canal, leading from the coal-pits at St. Helen's, in Lancashire, to the River Mersey, and constructed in order to convey coals to Liverpool†. The length of the canal is twelve miles, with a fall of ninety feet. The act of parliament passed in 1755; the original intention was only to render the rivulet called Sankey Brook, navigable; but it was found more advantageous to form a canal along its course. The surveyor was Mr. John Eyes.

But the Duke of Bridgewater is justly venerated as the grand founder of inland navigation: his spirit and opulence were happily seconded by Brindley, than whom a greater natural genius in mechanics never existed. It was in the year 1758 that the first act was obtained for these great designs. The first canal extends from Worsley mill, about seven computed miles from Manchester, and reaches that town by a course of nine miles, a circuit of two miles being necessary for the sake of the level. In this short space almost every difficulty occurred that can arise in similar schemes; but mountains and rivers yielded to the genius of Brindley. There are subterraneous passages to the coal in the mountain, of near a mile in length, sometimes cut through the solid rock, and occasionally arched over with brick; with air funnels to the top of the hill, some of them thirty-seven yards perpendicular. This beautiful canal is thrown over the river Irwell, by an arch of thirty-nine feet in height, and under which barges pass without lowering their masts. Yet the expense of this noble canal, in the then comparatively cheap state of labour and provisions, was only computed at 1000 guineas a mile. The various machines and inventions of Brindley, for its construction and preservation, deservedly excite wonder, but a detail cannot be here expected. The Duke of Bridgewater soon afterwards extended a canal of twenty-nine miles in length, from Longford bridge, in Lancashire, to Hempstones in Cheshire.

After this deserved tribute to the fathers of inland navigation in England, it will be eligible to review the other canals in a geographical manner, proceeding from the north to the south. In the county of Durham, a canal was projected by Brindley, from the romantic village of Winston, on the river Tees to Staindrop, and thence by Darlington to Stockton: but this design, and others not yet carried into execution, shall be passed over, and only the most important of those which have been executed shall be commemorated.

First in order is the Lancaster canal, extending from Kendal, in Westmoreland, by Lancaster, to West Houghton, in Lancashire, a space of about seventy-four miles.

* Philips, Hist. of Inland Navigation, 1795, 4to, p. 72.

† Ibid. Addenda 29.

The canal from Leeds to Liverpool, directed in a northerly course by Skipton, winds through an extent of 117 miles; and from this canal a branch also extends to Manchester, begun in 1771.

From Halifax to Manchester is another considerable canal, commonly called that of Rochdale; length thirty-one miles and a half, begun in 1794.

Another canal extends from Manchester towards Wakefield; and another called the Peak Forest canal, stretches from the former, south-east, about fifteen miles.

Another joins the river Dun, several miles above Doncaster, to the River Calder, near Wakefield.

To pass several of smaller note, the Chesterfield canal extends from Chesterfield, in the county of Derby, to the Trent at Stockwith, a course of forty-four miles and three quarters, begun in 1770.

In Lincolnshire, one canal extends from Lincoln to the Trent, and another from Horncastle to Sleaford. Grantham canal reaches from that town to the river Trent, a course of thirty-miles.

The grand design of Brindley was to join, by inland navigation, the four great ports of the kingdom, Bristol, London, Liverpool, and Hull. Liverpool is accordingly connected with Hull by a canal from that long navigable river the Trent, and proceeding north to the Mersey. The canal which joins these two rivers is styled the Grand Trunk; and was begun in 1766, under the direction of that great engineer; but was not completed till 1777; the length is 99 miles. It was attended with great difficulties, particularly in passing the river Dove, in Derbyshire, where there is an aqueduct of twenty-three arches, the tunnel through the hill of Hare-castle, in Staffordshire, is in length 2880 yards, and more than 70 yards below the surface of the ground, and was executed with great labour and expense *. But the utility corresponds with the grandeur of the design: salt from Cheshire, coals and pottery from Staffordshire, and manufactures from various places, are transported on this canal.

From the Grand Trunk five or six branches extend in various directions: among which must not be omitted that to the river Severn, near Bewdley, which connects the port of Bristol with those of Liverpool and Hull; the length is 46 miles; completed in 1772.

From the city of Chester one canal extends to the Mersey, and another to Namptwich; another proceeds south to Shrewsbury, uniting the Mersey and the Severn; with north-west, and south-east branches of considerable length.

From Coventry, in the centre of the kingdom, canals extend to the Grand Trunk; to Ashby-de-la-Zouch, and to the Braunston, or Grand Junction Canal.

What is called the Staffordshire canal, extends from the Grand Trunk to the river Severn; and is met by the Kington canal, which reaches to Kington, in Herefordshire, so as almost to join the rivers Trent and Wye. It may here be observed, that in this description

* Cary's Plans, p. 26, 27, 28. The account of the Grand Trunk in Philips, is very defective; he may here be referred to in general for the others. See also Housman, 122.

the grand courses of navigation are attended to, rather than the minute names and divisions of the canals.

Several inland navigations pass by Birmingham. The union canal completes a course of forty-three miles and three quarters, from Leicester to Northampton, whence the river Nen is navigable to the sea.

Another canal extends from Gloucester to Hereford: and the south of Wales presents several navigations of considerable length, particularly that from Brecon, in Brecknockshire, to Newport, in Monmouthshire.

The Severn is not only joined with the Trent and the Humber, by various courses of navigation, but is united with the Thames, by a canal extending by Stroud to Lechlade, a course of near forty miles.

Other canals branch out from the Thames in various directions: that of Oxford extends to the Grand Trunk, or rather joins the Coventry canal, after a course of ninety-two miles.

The Braunston, or Grand Junction canal, reaches from Brentford, on the Thames, and joins the Oxford Canal at Braunston, in Northamptonshire, after a course of ninety miles. It is styled the Grand Junction, because it may be said to unite the numerous courses that pervade the central counties, with the capital of the kingdom.

On the south of the Thames, a canal proceeds from Reading to Bath; and another from Weybridge to Basingstoke; and a third from Weybridge to Godalming.

A small canal or two have been executed in Devonshire. The Andover canal, in Hampshire, extends from Andover to Southampton water. Sussex presents two canals, that of Arundel, and that of Lewes.

When we reflect that all these laudable efforts of improvement and civilization, have been executed within these forty years, there is room for well-grounded hopes, that in the course of centuries the kingdom may be intersected, like another China, with innumerable canals, to the inconceivable advancement of agriculture, commerce, and the national industry and prosperity. The sum already expended in these noble works, has been computed at five millions and a half; but how much more usefully employed, than in fruitless wars, which consume fifty millions in one year!

MANUFACTURES AND COMMERCE. The manufactures and commerce of England, form so extensive a theme, that only a brief and fugitive idea of them, can be here attempted. The earliest staple commodity of England was tin, a metal rarely found in other countries. The Phœnicians first introduced it into commerce, at least five or six hundred years before the Christian æra; and their extensive trade soon diffused it among the oriental nations. The Romans, upon their conquest of these regions, did not neglect this source of wealth; but as Cornwall was not conquered by the Anglo-Saxons, till the reign of Athelstan, we know not whether the Cornish Britons carried on any considerable traffic in this commodity, though it be probable that it was at least exchanged for the wines of France. Yet even in the reign of John, the product was so inconsiderable, that the mines were farmed

to Jews for one hundred marks; but in that of Henry III, they began to yield a large profit, which has gradually increased*.

Cornwall, like most countries that abound with minerals, presents an external aspect of desolation: a series of barren hills, and bleak heaths, pervades its whole length; and the violent winds from the sea check the vegetation of trees and shrubs. The tin mines are numerous, and of various descriptions. This metal is either found in the mass, in what are called *lodes* and *floole*; or in grains, or bunches, in the rocks; or detached in separate stones, called *shodes* or *strings*; or in a course of such stones called the *beukeyl* or *living string*, or in the pulverized shape of sand. After having been pounded in a mill, it is melted into blocks of 320 pounds weight. In the ore it is styled black tin: but is sometimes, though very rarely, found in a metallic state.

The singularity and importance of this first national staple, may apologize for this discussion; but the abundance of the other topics will require more brevity. Wool had been regarded as a grand staple of England, as early as the twelfth century, but was chiefly exported in a crude state, till Edward III encouraged settlements of Flemish manufacturers. Wool soon became the standard of private property, and the prime article of commerce. Taxes and foreign subsidies were estimated by sacks of this commodity†. Great quantities of raw wool continue to be exported to the Netherlands and Hanse Towns; but in the reign of Elizabeth it began to be chiefly manufactured at home, and the exportation of woollen cloths was then valued at a million and a half annually. The exportation of raw wool was at length prohibited; and the woollen manufactures preserve great importance, though they no longer attract such particular regard, amidst the exuberance of English manufactures.

In recent times, the manufactures of iron and copper, native minerals, have become great sources of national wealth; nor must the new and extensive importation of elegant earthen-ware be forgotten. The cotton manufacture is diffused far and wide, forming a grand source of industry and prosperity. That of linen is not much cultivated in England, though nature would rather demand that flax should be cultivated in this fertile country, while sheep and wool were restricted to the hilly pastures of Scotland. The manufactures of glass and fine steel, clocks, watches, &c. are deservedly eminent and extensive. As the nation is indebted to Wedgewood for converting clay into gold, so to Boydell for another elegant branch of exportation, that of beautiful prints.

Besides manufactured articles, England exports a number of native products too numerous to be here mentioned.

The English manufactures have been recently estimated at the annual value of 63,600,000*l.* and supposed to employ 1,585,000 persons‡. Of these the woollen manufacture is supposed to yield in round sums, 15,000,000*l.* the leather 10,000,000*l.* the iron, tin, and lead 10,000,000*l.* the cotton 9,000,000*l.* The other chief manufactures, which yield

* Borlase's Cornwall. † Campbell's Political Survey, vol. ii. p. 151, 152. A work opulent in materials, but of most tedious and uncouth execution.

‡ Mr. Grellier, in the Monthly Mag. January 1781.

from 1 to 4,000,000*l.* may be thus arranged, according to their consequence, steel, plating, &c. copper and brass, silk, potteries, linen and flax, hemp, glass, paper.

The commerce of England is, at the present period, enormous, and may be said to extend to every region of the globe. It was conceived that the defection of the American colonies, would have proved detrimental in this view; but the commercial consequences have been little important. The trade with the West Indies furnishes another grand resource; and that with the East Indies alone, would have astonished any of the celebrated trading cities of antiquity. The following table will present a more complete view of the subject, than could otherwise be conveyed. It relates solely to the port of London for one year, ending 5th of January, 1795, since which the commerce has increased.

Names of the Countries.	Value of Imports into London.			Value of Exports from the port of London, to foreign parts.					
				British Manufactures			Foreign Merchandize.		
	£.	s.	d.	£.	s.	d.	£.	s.	d.
Ireland	2,209,501	3	4	168,687	18	3	914,352	4	4
British West Indies	6,072,117	5	0	2,249,043	13	11	579,453	6	0
Conquered Islands	1,226,064	13	8	260,976	0	11	110,817	18	0
British American colonies	307,412	13	0	654,842	19	4	251,551	6	2
Guernsey and Jersey	91,936	1	2	12,001	13	10	21,616	16	8
Gibraltar	12,947	16	8	83,473	14	11	69,315	2	8
Honduras Bay	14,696	4	2	2,029	18	11	2,550	16	2
South Fishery	197,680	8	6	21	6	8			
Asia, including East Indies	8,916,950	2	10	3,398,680	1	4	185,190	16	0
Africa	66,013	8	4	90,593	12	9	188,743	16	6
Turkey	641,860	19	2	32,065	12	0	123,776	7	2
Straits	8,399	14	0						
Venice	82,107	16	0	6,203	17	11	16,305	7	2
Italy	1,215,012	15	0	80,980	18	9	340,786	0	8
Spain	1,070,697	18	0	205,096	4	4	265,169	3	4
Portugal	644,610	3	8	182,780	6	2	119,813	12	6
Madeira	7,479	16	8	27,998	6	10	6,886	18	2
Canaries	6,763	19	10	20,116	18	4	377	5	2
France	130	6	8	3,216	5	3	63,625	10	6
Austrian Flanders	137,249	5	0	129,413	9	7	887,642	18	10
Holland	1,203,515	3	6	114,458	3	7	1,968,687	3	4
Germany	1,089,307	19	4	1,044,634	18	0	6,176,100	14	8
Prussia	196,657	3	2	54,380	14	0	272,719	17	4
Poland	104,978	10	4	7,022	11	10	57,067	2	4
Sweden	262,727	3	4	33,845	5	6	111,457	14	4
Russia	1,269,688	9	6	95,319	8	8	491,244	9	2
Denmark and Norway	166,366	1	0	147,340	5	11	545,509	19	8
Greenland	26,753	11	2						
United States of America	811,511	18	8	2,251,280	12	1	429,248	7	8
Florida	16,239	16	0	38,067	0	3	8,855	0	0
Foreign West Indies	56,240	2	0	1,767	13	10	60	0	0
Prize Goods	1,572,868	8	8				Included in the account of each country.		
	29,706,476	17	4	11,396,539	13	8	14,208,925	14	6

RECAPITULATION.

The aggregate value of goods imported into London in one year				29,706,476 17 4
British manufactures exported	£. 11,396,539	13	8	
Foreign Merchandize, do.	14,208,925	14	6	
				25,605,465 8 2
Value of goods imported in upwards of 9000 coasting vessels, averaged at 500*l* each.	4,500,000	0	0	
Value of goods exported coastways in about 7000 vessels, at 1000*l*. each.	7,000,000	0	0	
				11,500,000 0 0
Total amount of property shipped and unshipped in the river Thames, in the course of a year, estimated at				66,811,942 5 6

If to this estimate be added those of the ports of Liverpool, Bristol, &c. how enormous must be the amount*.

From the states of North America, are chiefly imported tobacco, rice, indigo, timber, hemp, flax, iron, pitch, tar, and lumber: From the West Indies, sugar, rum, cotton, coffee, ginger, pepper, guaiacum, sarsaparilla, manchineal, mahogany, gums, &c. From Africa, gold dust, ivory, gums, &c. From the East Indies and China, tea, rice, spices, drugs, colours, silk, cotton, salt-petre, shawls, and other products of the loom. From our remaining settlements in North America, are imported furs, timber, pot-ash, iron; and from the various states of Europe, numerous articles of utility, and luxury.

On introducing the Income Tax, Mr. Pitt gave the following estimate of the annual income of Great Britain†.

The land rental, after deducting one-fifth	£20,000,000
The tenant's rental of land, deducting two-thirds of the rack-rent	6,000,000
The amount of tythes, deducting one-fifth	4,000,000
The produce of mines, canal navigation, &c. deducting one-fifth	3,000,000
The rental of houses, deducting one-fifth	5,000,000
The profits of professions	2,000,000
The rental of Scotland, taking it at one-eighth of that of England	5,000,000
The income of persons resident in Great Britain, drawn from possessions beyond the seas	5,000,000
The amount of annuities from the public funds, after deducting one-fifth for exemptions and modifications	12,000,000
The profits on the capital employed in our foreign commerce	12,000,000
The profits employed on the capital in domestic trade, and the profits of skill and industry	28,000,000
In all	£.102,000,000

By others, the landed property of Great Britain has been computed at the rental of 33,000,000*l*. which, at thirty years purchase, would yield 990,000,000*l*.; the rental of houses in England and Wales‡, at 74,260,000*l*. and estimating that of Scotland at about a sixth, the value

* Colquhoun (or Cohoun) on the Police.
† New Annual Register, for 1799, p. 114.
‡ Grellier, Month. Mag. Sept. 1800.

at fifteen years purchase, might be about 130,000,000*l.* The cattle and farming-stock, about 100,000,000*l.* the furniture, apparel, &c. 26,000,000*l.* The navy and merchant-ships have been valued at 16,000,000*l*; the goods in the hands of merchants and wholesale dealers, more than 13,000,000*l.* and those in the hands of manufacturers and retail traders, more than 22,000,000*l.* Including the money, of which the estimate is far from certain, the whole capital of Great Britain may be calculated at more than one thousand, two hundred millions*.

In the year 1797, the amount of the exports, according to Custom-house accounts, was 28,917,000*l.* and of the imports, 21,013,000*l.*†, yielding, as is supposed, clear profits on foreign trade, to the amount of at least 10,000,000*l.* The number of merchant vessels is supposed to amount to 16,000; and it is supposed that 140,000 men and boys are employed in the navigation.

* In the beginning of the eighteenth century, Gregory King supposed the value of England and Wales to be 650,000,000*l.* MS. Harl. No. 1,898. The national debt now approaches 500,000,000*l.*

† Mr. Pitt in 1799, computed the imports at 25, and the exports at more than 33,000,000*l.* In Feb. 1801, the foreign exports at 17, the domestic 20,000,000*l.* in all 37,000,000*l.*

CHAPTER IV.

NATURAL GEOGRAPHY.

CLIMATE AND SEASONS.—FACE OF THE COUNTRY.—SOIL AND AGRICULTURE.—RIVERS.—LAKES.—MOUNTAINS.—FORESTS.—BOTANY.—ZOOLOGY.—MINERALOGY.—MINERAL WATERS.—NATURAL CURIOSITIES.

CLIMATE AND SEASONS. THE climate of Great Britain is perhaps more variable than that of any other country on the globe, as the vapours of the Atlantic ocean, are opposed to the drying winds from the Eastern Continent. The western coasts in particular, are subject to frequent rains; and the eastern part of Scotland is of a clearer and dryer temperature than that of England. The humidity of the climate, indeed, clothes the delicious vales and meadows with a verdure unknown to any other region; but is injurious to the health of the inhabitants, by causing colds and catarrhs, the frequent sources of more deadly disorders, particularly of consumptions, which are fatal to many in the prime of youth. The moist and foggy climate conspires with the great use of gross and animal food, to produce that melancholy, which is esteemed by foreigners a national characteristic. As trees particularly attract the moisture of the atmosphere; it may be questioned whether the noted abundance of them in England, contribute to the general salubrity.

In consequence of the mutability of the climate, the seasons themselves are of uncertain tenor. Aged people have always been given to magnify the advantages of their youth, but many observers, endowed with philosophical skill, and candid judgment, have agreed, that since the year 1775, a considerable change has taken place in the temperature of the year, both in Great Britain and Ireland*. The winters in general have been more moist and mild, and the summers more humid and more cold, than will be found on an average of preceding years. The year might more properly be divided into eight months of winter, and four of summer; than into any theoretic arrangement, originating in the southern latitudes. What is called the Spring, dawns in April, commonly, indeed, a mild month; but the eastern winds prevalent in May, seem commissioned to ruin the efforts of reviving nature, and destroy the promise of the year. June, July, August, and September, are usually warm summer months; but a night of frost is not unknown, even in August, and sometimes a cold east wind

* See Memoirs of the Irish Academy, vol. ii.

will blow for three days together; nor of late years are summers unknown of almost constant rain*. What the gardeners call *blight*, seems also more common in England than in any other region; and whatever be the cause, is frequently very destructive, especially to the hop-plants and the fruit trees. The winter may be said to commence with the beginning of October, at which time domestic fires become necessary; but there is seldom any severe frost till Christmas, and January is the most stern month of the year. Yet, as our summers often produce specimens of winter, so now and then gleams of warm sunshine illuminate the darker months, though rarely amounting to what the French call *un eté de St. Martin*, or Martinmas summer. March is generally the most unsettled month of the year, interspersed with dry frost, cold rains, and strong winds, with storms of hail and sleet.

Face of the Country. A chief step to the study of Geography, consists in the knowledge of what may be termed the physiognomy of the country, yet has no province in this science been so completely neglected. We have even maps of Scotland and Switzerland, without mountains, and maps of China without canals. The chief features of any country are its hills, vales, and rivers; and of a maritime state, the sea-coast. Mr. Pennant, in his Arctic Zoology, has given an admirable description of part of the English shores, which shall here be abbreviated, with an alteration in the arrangement, as he chooses to begin with the Straits of Dover.

From the mouth of the Tweed to Bamborough, extends a sandy shore; and the most remarkable object is Lindesfarn, or Holy Island, divided from Northumberland by a level, which is dry at low water, but out of which the flowing tide oozes suddenly, to the terror and peril of the unwary traveller. From Bamborough Castle, to Flamborough-head, are mostly low cliffs, of lime-stone, and other materials; and at Sunderland of a peculiar stone used in building, and which seems the work of marine insects. Scarborough stands on a vast rock, projecting into the waves; but Flamborough-head is a far more magnificent object, being formed of lime-stone, of a snowy whiteness, and stupendous height, visible far off at sea. Grand caverns open on the north side, "giving wide and solemn admission, through most exalted arches, into the body of the mountain; together with the gradual decline of light; the deep silence of the place, unless interrupted by the striking of the oar, the collision of a swelling wave against the sides, or the loud flutter of the pigeons, affrighted from their nests in the distant roof, afford pleasures of scenery, which such formations as this alone can yield. These also are wonderfully diversified. In some parts the caverns penetrate far, and end in darkness; in others are pervious, and give a romantic passage by another opening, equally superb. Many of the rocks are insulated, of a pyramidal form, and soar to a great height. The bases of most are solid, but in some pierced through and arched. All are covered with the dung of the

* The summer of 1800 was remarkable for dryness and warmth, scarcely any rain falling from the 6th of June to the 20th of August, when a thunder storm succeeded.

innumerable flocks of migratory birds, which resort here annually to breed, and fill every little projection, every hole which will give them leave to rest*."

Hence to the Humber are commonly clay cliffs; and near Spurnhead, amber is sometimes found. The extensive coast of Lincolnshire is flat, and, according to Mr. Pennant's opinion, has been gained from the sea; though, in some parts, the sea has in its turn invaded the land, and the remains of a forest are visible under the waves. The county of Lincoln, and part of six others, are the low countries of Britain; and the coast is distinguishable by churches, not by hills. The shores of Norfolk and Suffolk present sometimes loamy or clayey precipices, sometimes hillocks of sand, and sometimes low and flat spaces. Hunstanton-cliff rises to the height of about eighty feet, composed of chalk and friable stone, resting on a base of what is called iron-coloured pudding stone†, projecting into the sea. The coast of Essex is generally low; but to the south of the Thames, arise continued cliffs of chalk, with layers of flint, resembling masonry. The North Foreland is a lofty chalky promontory; and the Cliffs of Dover are known to every reader of Shakspeare.

It is to be regretted that Mr. Pennant did not extend his animated description to the southern and western coasts: cliffs of chalk and clay are interspersed with flat gravel, till the island of Portland presents its bold rocky front. The western shores abound with granite, and other siliceous rocks.

Soil and Agriculture. The soil and agriculture of England, are topics which have recently been illustrated in such a multiplicity of meritorious works, that the subject labours under the abundance of the materials. A few very general remarks must here suffice. The soil is greatly diversified, but in general fertile; and in no country is agriculture more thoroughly understood, or pursued in a grander style, except, perhaps, in Flanders and Lombardy. The nobility and gentry, mostly residing upon their estates in summer, often retain considerable farms in their own hands, and practise and encourage every agricultural improvement. The writings of Mr. Young, the institutions in the west, and the Board of Agriculture recently erected, have contributed to diffuse a wide and lasting knowledge of this interesting branch. The intermixture of the green crops with those of grain, the use of turnips, the irrigation of meadows, the regular substitution of crops appropriated to the state of the land, the art of draining, conducted on scientific principles, may be mentioned among the recent advances of knowledge; nor must the improvements among the breed of sheep and cattle, introduced by Bakewell and others, be forgotten.

Amidst such topics of just exultation, it is mortifying to reflect upon two circumstances, the deficiency of a proper supply of grain, and the immense extent of the waste lands in this industrious country. The cultivated acres in England and Wales are computed at upwards of 39,000,000, while those uncultivated are 7,888,777. Of these it is

* Pennant's Arctic Zoology, vol. i. p. 15.

† The *farcilite* of Kirwan from the Latin: better from the Greek, *ballasite*.

supposed that not above half a million is wholly unimprovable, and perhaps a million is only fit for plantations, while of the remainder one quarter is fit for tillage, and three-fourths for meadow and upland pasture*. Mr. Middleton† computes the arable land in South Britain at only 14,000,000 of acres, upon a general view of the consumption of the country, as we import corn proportionate to the produce of 378,000 acres. He supposes the state of crops on each 10,000,000 of acres to be as follows:

Wheat	2,750,000	Acres.
Oats and Beans	2,500,000	
Barley and Rye	750,000	
Roots	1,000,000	
Clover	1,000,000	
Fallow	2,000,000	
Total	10,000,000	

The utility of fallow is a dubious topic: and the million in clover may be arranged as pasture, which otherwise occupies not less than 21,000,000 of acres, while 2,000,000 are assigned to woods, copses, and hedge-rows‡; and more than 1,500,000 are unavoidably consumed in roads, rivers, and waters, &c. The subject can only be well discussed by the most competent judges; but it may be cursorily observed, that as the radical error of French agriculture, was an excess of land under grain, whence there was a deficiency of pasture, of cattle, and consequently of manure, so that the arable ground was starved; so in England there may, perhaps, be an excess of pasturage. Whatever be the causes, a growing population, certainly increasing luxury and waste, the neglect of the waste lands, or other sources, the consumption of grain in this country, has, it is believed, since the middle of the last century, particularly since 1767, generally exceeded the produce; and the evil has gradually increased to an alarming extent. On an average of eleven years, closing with 1793, the annual deficiency amounted to 587,163 quarters of grain||; nay, in 1795, the scarcity demanded a still further supply of 1,177,000 quarters; which also, divided by 11, will produce the whole annual defect of 694,163 quarters. Computing produce at three-quarters an acre, the land required, exclusive of the seed, would be 231,388 acres cropped with corn; while about half as much must be added for fallow and the rotation of crops. For an abundant supply of 500,000 acres might be requisite, which might seemingly be assumed with little difficulty from at least 1,500,000 waste acres in South Britain, which are fit for tillage. Yet this calculation would infer that the deficiency does not exceed the twenty-eighth part of the whole, which seems too small, as the bread has been doubled in price; and, indeed, these theoretic views can never pretend to much exactness. If South Britain annually produce 11,500,000 quarters of wheat, the deficiency can hardly be supposed less than a tenth part.

* First Report of the Committee of the House of Commons, p. 22.
† View of Middlesex, p. 484. ‡ Ib. 486. || Ib. 481.

Scarcity, indeed, multiplies the consumption, as the poor are reduced to the use of bread only; but still the rise in the price of that article, appears to exceed any fair calculation.

Horticulture, or the art of gardening, is also pursued in England with great assiduity and success. The large supply of the capital in vegetables and fruits, and the high prices given for early produce, occasion such a spirit of cultivation, that each acre thus employed, is supposed to yield about 120*l.* annually, the consumption in the metropolis being computed at more than 1,000,000*l.* annually. While Mr. Middleton computes the hop-grounds in South Britain at 44,000 acres, he allows 10,000 for nursery grounds, 50,000 for fruit and kitchen gardens, and 20,000 for pleasure-grounds, that is, the unprofitable parts of the latter, the rest being pastured for cattle, or mown for hay. Of ornamental gardens, laid out with a just attention to the beauties of nature, and free from the uncouth affectations of art, England is deservedly regarded as the parent country *. The first idea has been referred to Milton's description of Eden; and a paper in the Guardian is supposed to have induced Bridgman, a fashionable designer of gardens, to begin this reform, which was successfully followed by Kent, while the Duke of Argyle introduced the various foliage of exotic trees. One of Kent's best works was the garden at Rousham, while Claremont, Esher, and other places, also proclaim the extent of his powers. The new designs were seconded by several gentlemen of taste; and Kent was followed by Brown, who has been succeeded by Repton, and other masters of great abilities. In the course of little more than half a century, this taste has not only been diffused in Great Britain, but has been imitated in several favourite spots on the Continent, even as far as the rude climate of Russia.

Rivers. But the rivers and mountains of a country constitute its most important features; and without just delineations of them, the geographical portrait cannot boast much truth or resemblance. England is intersected by four important rivers, the Severn, the Thames, the Humber, and the Mersey.

Severn. The Severn rises from the mountain Plenlimmon, and after an easterly course to Shrewsbury, bends its progress almost south to Gloucester, whence it flows south-west into the Bristol Channel, a progress of about 150 miles, navigable as far as Welch-pool. Its chief tributary streams are the Northern and Southern Avons, the Teme and the Wye †.

Thames. The Thames originates in Cotswold-hills, Gloucestershire; and maintains a south-easterly direction, to its egress into the German Ocean, after receiving the Cherwel, the Teme, the Kennett, another Wye, the Mole, and Lee. The Medway flows into the estuary of the Thames, as the Wye into that of the Severn. The course is computed at 140 miles, navigable to Cricklade ‡.

Humber. The Humber is a name almost confined to a large estuary, which receives many considerable rivers that fertilize the central parts of England. Of these the Trent is the most important,

* Lord Orford on Modern Gardening.
† Campbell, I. 146. ‡ Ibid. I. 189.

which rises at New-pool, in Staffordshire, and proceeding north-east, enters the Humber, after a direct course of about 100 miles, being navigable to Burton in Staffordshire. The other principal rivers that issue into the Humber, are the Dun, a navigable stream which runs by Doncaster; the Aire navigable to Leeds, and the Calder navigable to Halifax, both singularly useful in transporting the woollen manufactures; the Warf, navigable to Tadcaster; and the noble river Ure, or Ouse, which runs by York, and forms another grand branch of the Humber, navigable to Rippon: nor must the Derwent be omitted, which is navigable to New Malton; nor, though last and least, the Hull. The Humber may be regarded as the stem of a venerable oak, which, as usual with that tree, spreads its chief branches in a horizontal direction.

Mersey. Though the Mersey present a grand estuary, its course is not of great extent. It arises in the West Riding of Yorkshire, and runs to the south-west; but the estuary bends towards the north. The direct course is not above 50 miles; and is navigable to Stockport; as the Irwell to near Manchester, and the Weever to near Northwich, and the mines of rock-salt.

In briefly describing the other navigable rivers of this kingdom, it may be proper to return to the Severn, and proceeding south-west, pursue the outline of the coast. The Avon is navigable to Bath, the Perrot to Ilchester, the Tone to Taunton, the Taw to Barnstaple, and another branch to Biddeford; the Camil of Cornwall, to Wedbridge, while the Plym, Dart, and Ex, can also be pervaded to a considerable height. Another Avon is navigable to near Salisbury, the Itchyn to Winchester, the Arun to Arundel, the Ouse to Lewes: the Rother, which forms the haven of Rye, is yet navigable, though fallen in fame. The Stour admits boats even to Canterbury; but the Medway presents a navigable stream as far as Tunbridge. On the north of the Thames, the Lee is navigable to Bishop's Stortford and Hertford; the Crouch conveys boats from the sea to Hull-bridge in Essex; the Black-water to Chelmsford, and another branch to Colchester. The Stour is navigable to Sudbury; the Orwell to Stow, the Deben to Woodbridge: the Yare and Waveney present access to Foulsham and Bungay. Next is the estuary called the Wash, which receives the Ouse, the Nen, the Welland, the Witham, all streams of considerable navigation.

On the north of the Humber, the Tees admits vessels to Stockton; the Tyne to Newcastle. On the West, the Eden is navigable to Carlisle; the Lon to Lancaster and Hornby; the Dee to Chester; the Conway to within two miles of Llanrwst; the Tivey to Llanpiter. Milford Haven presents branches navigable to Haverford-west, and to near Wiston: and lastly, the Wye may be pursued as far as Hay, in Brecknockshire.

In general it may be observed of the British rivers, that the length of their course is inconsiderable, when compared with that of the Continental streams. The length of the Thames compared with that of the Danube, is only as 1 to 7, and with that of the Nile, as 1 to 12. The Kian Keu of China, and the river of Amazons in South America, extend through a progress of more than fifteen times the length of that of the Thames. The rivers of the southern and middle parts of England,

present a striking contrast to those of the north; the former pursuing a slow and inert course over mud, between level banks, amid rich and extensive meadows; while the latter roll their clear torrents over beds of gravel, between elevated banks, and rocky precipices; and even when verdant levels occur, the stream still retains its banks and beds of gravel.

MOUNTAINS. The mountains form another grand feature of geography. They seldom appear single, but are either disposed in lines or ridges, called chains, or in anomalous clusters. When they can be arranged under the first form or denomination, as the Alps for example, or the Pyrenees, they afford great clearness to geographical limits and descriptions. It is not, however, to be conceived, that a chain of mountains forms one series, as delineated in small maps, for the leading summits diverge on both sides into extensive ribs, gradually melting into the champaign country. And the clusters, if accurately surveyed, will generally be found to present central elevations, whence smaller branches irradiate.

While Bennevis, the highest mountain in Scotland, is not much above one quarter of the height of Mont Blanc, the sovereign of the Alps, the English and Welch summits aspire to heights still less considerable; Snowden being only 3568 English feet above the sea, while Bennevis is 4387, or by other accounts, 4350. But Wharn, or Wharnside, in Yorkshire, was estimated at 4050*.

* In the map of the West Riding, in Cary's English Atlas, Wharn is said to be 1780 yards, or 5340 feet; while Ingleborough is 1760 yards, or 5280 feet; and Pennigent 1740 yards, or 5220 feet. This measurement is from the map of Yorkshire, by Jeffries.

Mr. Housman, in his Description of Cumberland, &c. (Carlisle, 1800, 8vo.) is the most recent authority for the height of the British mountains, which he exhibits in the following table:

"HEIGHTS OF THE MOUNTAINS ABOVE THE LEVEL OF THE SEA.

	Feet.
Snowden, in Wales, by Waddington	3456
Whernside ..... do	4050
Pendle hill ..... do	3411
Pennygent ..... do	3930
Ingleborough ..... do	3987
Helwellyn, by Donald	3324
Skiddaw ..... do	3270
Cross-fell ..... do	3390
Saddleback .... do	3048
Benlomond	3240
Benevish	4350
Ben-y-bourd higher ..... By Pennant.	
Laghin-y-gair	
Benwewish ..... Perpetual snow.	
Skiddaw, by the experiments of Mr. Walker, from the plane of the sea, at Whitehaven	3530
Cross-fell, by Pennant	3839"

But great skill and precision are required in measuring the heights of mountains. A late excellent mathematician, Mr. Ewart, of Lancaster, measured the height of Ingleborough, with select and high-priced instruments, and great care. Here is the result, as communicated to me by Dr. Garnett:

Even at the present day, the geography of some parts of New Holland, is better understood than that of some parts of Great Britain. There is not even a separate map of the English rivers, though France set an example of this kind, a century and a half ago; nor has there been any attempt to delineate the chains of mountains in England. The imperfection of the materials must therefore apologize for any errors or defects in the subsequent slight sketch. The mountains of Cheviot may be said to form a regular ridge, running from the south-west, where they join those of Galloway to the north-east. But there is a central ridge which pervades England from north to south, beginning at Geltsdale forest, 14 miles S. E. of Carlisle*, and passing on the west of Durham and Yorkshire, where it contains mines of coal and lead, but is split into insignificant appellations of *fells* and *laws*. Kelton-fell, Stanmore, Widehill-fell, Wildboar-fell, Bow-fell, Homefell, Bunhill, &c. &c. arise on the western limits of Yorkshire. Cumberland and Westmoreland present many detached mountains, Skiddaw, &c. which can hardly be reduced to any distinct arrangement; but those of Craven, in the West Riding of Yorkshire, as Wharn, or as commonly called by the country people, Wharnside, Ingleborough, and Pennigent; and Pendle on the east of Lancaster†; belong to the Central Chain, which proceeds south, through Derbyshire, still abounding with minerals and natural curiosities; but here it seems to terminate, spreading a little into Cheshire. Still, however, a central chain of smaller elevation, may be traced, in a zig-zag line, to near Salisbury, with two diverging and irregular branches on the east, one towards Norfolk, another into Kent, while a third runs south-west into Cornwal. To the first belong the hills of Gogmagog, in Cambridgeshire, &c. to the second the hills of Hampshire, Surrey and Kent. Malvern hills, in Worcestershire, deviate from the central ridge, while those of Cotswold, in Gloucestershire may be regarded as a continuation of

Height of Ingleborough above the level of the Sea, in feet and decimals.

By barometrical admeasurement	2377,12
By trigonometrical	2380,79
Difference only	3,67

Wharn cannot be above 100 feet higher, while Pendle and Pennigent are lower. The measurements by Donald are probably near the truth: Cross-fell being, in Dr. Garnett's opinion, the highest mountain in England.

Mr. Housman has, however, given a good general view of the English mountains. On coming from the south (p. 5.) they begin in Derbyshire, stretching a little into Cheshire. The tops of the ridges are commonly wet and boggy, and produce heath, bent-grass, and rushes. They are almost universally calcareous. Near Penrith (p. 8.) they almost wholly disappear. The summit of Cross-fell (p. 18.) is scarcely 1000 yards above the sea, and presents a large heap of loose whitish free-stone, or, more probably, argillaceous grit.

* The heathy tract extends to Bewcastle and Nichol Forest, but is level. Housm. 427.

† That Ingleborow-hill, Pendle, and Pennigent,
Should named be the highest betwixt our Tweed and Trent.
Drayton's Poly-Olbion, Song 28.

It is remarkable that Wharn, the highest, is omitted.

it. The hills of Mendip, Polden, Sedgemoor, Blackdown, in Somersetshire; the Tores and Wilds of Dartmore, in Devon; and the hills and upland downs of Cornwal, extend this chain to the Land's End: and after passing this last rocky province, it expires in the Islands of Scilly *.

Wales is a country abundant in mountains, especially the northern provinces; but their orology remains indeterminate, and it would require the actual survey of an experienced engineer, to reduce them to chains or groupes. To begin with the North, Snowden commands the first attention, a mountain of eminent height and fame. The top is called Y Widdfa, or the conspicuous, forming almost a point, and presenting a view of the county of Chester, the mountains of Yorkshire, part of Scotland and Ireland, and the Isles of Man and Anglesey †.

Mr. Pennant does not specify the stone that composes it (probably a granite;) but he observes that "large coarse crystals are often found in the fissures, and very frequently cubic pyritæ, the usual attendants on Alpine tracts." From Snowden, a line of mountains extends by the sea to Plenlimmon, a boundary of North Wales, whence issue the noble rivers Severn and Wye. Of these hills, Urrou Seth, Cader Idris, and Moyle Vadiau, are the most memorable. The hills on the east of North Wales are far from attaining such considerable elevation, and gradually decline to the hills of Shropshire, of which the Wrekin is one of the most noted ‡.

A chain proceeds due south to near Cardiff, in South Wales; it is of far inferior height, and a small branch diverges to the west, consisting of Cwn Cothy, Mynydd, Carreg, Brisley, and Cwm Kerrun-hills. On the east of South Wales, are the hills of Herefordshire, the Black Mountain, Cusop-hill, Hargest, Stockley-hill, &c.

In the northern and western mountains and hills, chalk is unknown, while it forms a chief material of those of the south and east. An

* Among the smaller elevations may be named the Chiltern-hills, (whence the vague office of Steward of the Chiltern Hundreds) reaching from Tring, in Hertfordshire, to Henley, in Oxfordshire. In the latter county are Nettlebed and Shotover-hills.

† Pennant's Journey to London, p. 170.

‡ Mr. Aikin, in his Tour in Wales, has considerably illustrated this subject. He observes (p. 19.) that the Ferwyn mountains occupy the east side of Merioneth, branching into Denbigh and Montgomery; length about sixteen miles, breadth from five to ten. Cader Idris is the second in height of the Welch mountains (about 3000 feet) and from it extends a primitive chain, running N. N. E. in the Arrans and Arrangis, consisting of porphyry and granitell. The second grand ridge, that of Snowden, also runs N. N. E. and consists of schistose hornblende, micaceous schistus, granite, and porphyry, with some large blocks of serpentine: this chain extends from Penmaenmawr, towards Traethmawr; and after forming conic peaks at intervals, it ends in the northern horn of Cardigan-bay, that is the southern promontory of Caernarvonshire.

May not the mountains of Westmoreland and Cumberland be considered as elongations of these two chains, that of Snowden passing from the promontory on the west of the bay of Lancaster, by Helvellyn, and ending in Saddleback and Skiddaw; while the other passes from near the river Ken, by Shap Fell, &c?

eminent naturalist observes, that a line drawn from Dorchester, in the county of Dorset, to the county of Norfolk, would form a boundary of the great chalky stratum which intersects the kingdom, none being found in any quantity to the north or west of that line*. The northern mountains are mostly composed of lime-stone, free-stone, slate or schistus, with mines of lead or coal; those of Derbyshire present vast masses of lime-stone, intersected with thick veins of toad-stone, by some asserted to be the produce of fire, while others assign an aqueous origin†, and numerous fossils and minerals, the consideration of which is reserved for a future article. The summit of Skiddaw presents white shivery slate, or argillaceous schistus; but some of the Westmoreland mountains contain siliceous schistus‡; and it is probable that granite may exist in those of Cheviot. The vast base of Ingleborough, near thirty miles in circuit, consists of lime-stone; on the east side full of shells to near the summit, which is of grit and sand-stone slag; the fossils black and brown marble, thin slate near Ingleton, rotten-stone or tripoli, and some lead-ore||. And such is this chain to its termination; while further to the south, the easterly elevations are of chalk; and those on the west, as Mendip hills, in Somersetshire, are wholly calcareous. The granite begins at Dartmoor, in Devonshire, and continues through Cornwal, where it occurs of various colours, the grey granite, or moor-stone; the red, or oriental; the white, the yellow, and the bluish, or pigeon-coloured¶. Near the Lizard and Mullion, are rocks of serpentine and steatites, the latter being also found in a singular variolite, at Thorverton, between Exeter and Upton Pyne. The china-stone, or petunsi, used in making fine porcelain, is here a decomposed granite, the felspar having become soft like lithomarga.

The Welch mountains abound in various granites, with large masses of quartz and serpentine: a French traveller**, observes a similarity between the substances of the Welch mountains, and those of Wicklow in Ireland, whence he infers a primitive junction. While on the east of England the lime-stone succeeds the chalk (of which change the noble promontory of Flamborough-head, already described, affords a striking instance) on the coast towards Wales, are found granite, and other primitive rocks. The Wrekin, about ten miles east of Shrewsbury, is chiefly composed of reddish chert, or petrosilex, with siliceous sand-stone, basalt, and a kind of granite††. The great coal district of Colebrookdale, rests on indurated clay, while that near Bristol is accompanied by black free-stone, and even the calcareous free-stone near

* Pennant's Journey from Chester to London, p. 214.

† This toad-stone is by the miners called *cat-dirt*, but they unluckily apply the same name to a very different substance (a greenish lime-stone;) a circumstance which has deceived St. Fond, when he asserts that lead ore is found in the toad-stone, which is never the case.

‡ Called by Housman (p. 49.) hard grey flint. Fine blue slate abounds in Borrowdale. Ib. He says, (p. 229.) that near the summit of Wharn, there is a thin seam of coal, and another is said to correspond with it on a hill on the opposite side of Dentdale.

|| Guide to the Lakes, 265, 267.

¶ Pryce's Mineralogy of Cornwal. Mason's Western Tour, &c.

** Coquebert Journ. des Mines. †† Townson's Tracts, p. 163.

Bath, is interspersed with numerous veins of coal. The Malvern-hills on the S. W. of Worcestershire, run N. and S. about ten miles and afford many granitic rocks with chert and hornblende slate.*, These few notices must suffice on the composition of the English mountains, a subject which only begins to attract the attention which its curiosity deserves.

Forests. To the reader of poetry, the word *forest* conveys the idea of a region replete with thick and tall woods, interspersed with romantic lawns and murmuring rivulets. But in England a forest is sometimes bare of trees, or not unfrequently only presents a few withered oaks; and the term is even applied to upland downs and heaths. Many of the forests were, even in the Anglo-Saxon times, esteemed royal demesnes; but the Norman monarchs were so much addicted to the chace, that upwards of sixty forests at one time, appertained to the crown; of which the chief now remaining are the forests of Dean, in Gloucestershire; Sherwood, in Nottinghamshire; Windsor, in Berkshire; and the New Forest, in Hampshire. The royal forests constituting so large a part of the kingdom, of a distinct nature, and regulations different from other regions, many grievances arose, till the barons exacted from Henry III, the forest-charter; in which several despotic laws were revoked, and more equity extended to the neighbouring proprietors and tenants.

Besides the principal forests above-mentioned, other districts still retain the name, as Dartmoor-forest, in Devonshire; Enfield-chase, in Middlesex; Witham, and Epping-forest, and that of Henault, in Essex; Sacy and Wittleborough-forest, and Rockingham-forest, in Northamptonshire; Peak-forest, in Derbyshire; Malvern-chase and Wyre-forest, in Worcestershire; Cannock-chase, and Neidwood-forest, in Staffordshire; Mogg-forest, and Clun-forest, and that of Hays and Mocktree, in Shropshire; Macclesfield-forest, in Cheshire; Nether-dale-forest, and Langster-chase, in the West Riding of Yorkshire; the forest of Galtres, and Arkengarth and Stainmore, and Leyne, in the North Riding; Teesdale and Weredale-forests, in the county of Durham; Rosendale-forest, in Lancashire; Sleddell and Martindale-forests, &c. in Westmoreland; Geltsdale and Inglewood-forests, in Cumberland.

General Sketch of British Botany. Among the numerous species of vegetables which are natives of Britain, scarcely any are adequate to the sustenance and clothing of man. Our frequent rains, our blasting winds, and the scanty portion to which we are stinted, of the light and heat of the sun, deprive us entirely of those vegetable treasures, which, in the tropical climates, offer themselves in overflowing exuberance, to satisfy the wants and luxurious desires of their human inhabitants. The never-failing verdure of our plains and hills, covered with a rich carpet of grasses and papilionaceous plants, shews how admirably our country is qualified for the support of graminivorous quadrupeds; and we find accordingly that our ancient forests abounded in stags and roe-deer, as our cleared and cultivated lands do now with sheep and cattle. This seeming partiality of

* Townson's Tracts, p. 216.

nature, in thus scanting to man the supply of vegetable food, while it is profusely offered to the grazing herds of every kind, by obliging the early settlers in this island to depend for their support, principally on the flesh of animals, gave them stronger motives to personal exertion, than an equal state of civilization in a warmer climate, could have afforded. While the native of the tropical regions was receiving from the unpurchased bounty of nature, his regular and plentiful supply of cocoa-nuts, bananas, and bread-fruit, the Briton was obliged to earn his daily food, by the hard labour of each day, to chase the flying deer through the woods, or to dispute his prey with the boar or the wolf. Thus, by the severity of the climate, and the want of vegetable food, was the first germ of exertion ripened into activity, which by the combined influence of luxury and necessity, has at length laid all the vegetable riches of the globe at our feet.

In the general progression of science, botany has advanced with rapid steps, and has been cherished with peculiar fondness in our native island. The Flora of Britain, though it cannot boast the most splendid and exquisite of vegetable productions, yet contains as great a variety of genera and species, as any other country of equal extent. The investigation of indigenous, as well as exotic plants, is continually carrying on here with increasing ardour, and every year brings new accessions to our crowded ranks of native vegetables. It cannot be expected, therefore, that we should give a particular account of each species, and it would be but little agreeable or useful, to offer to our readers a barren list of Linnæan nomenclature: we shall, therefore, chuse a middle course, by giving a general view of the natural families under which the plants of England arrange themselves, and particularize by name only, such species, as from their utility or rarity, or other circumstances, may be worthy of individual notice.

Grasses. The first for importance and variety is the family of GRASSES. Almost every part of the country that is not under tillage, is principally covered with grass. Under almost all the differences of soil and situation, we find the chief covering of the richest, as well as of the most barren tracts, made up for the most part of these plants: to these we are indebted for the luxuriant verdure of our pastures, for the close velvet carpeting of our downs and sheep-walks, and the more scanty clothing of our mountainous districts. Twenty-seven genera, and a hundred and ten species of grass are natives of our island, most of them of common occurrence in situations where they are found at all. None of them have been proved to be poisonous, either to man or beast, on the contrary, whether fresh or dried, they furnish a grateful food to all our domestic cattle. The most important grasses in meadows and pastures, are the Anthoxanthum odoratum (sweet scented vernal grass;) Phleum pratense (cat's-tail grass;) Alopecurus pratensis and agrestis (fox-tail grass;) two or three species of Agrostis (bent-grass;) Aira flexuosa and cæspitosa (hair-grass;) Holcus lanatus and avenaceus (soft-grass;) Poa trivialis pratensis, &c. (meadow-grass;) Dactylis glomerata (cock's-foot grass;) Festuca avina pratensis elatior, &c. (fescue grass;) Avena pratensis and flavescens (oat-grass.) Other species are natives of marshes and wet places; these are generally the largest and most luxuriant, and if in quality

they be somewhat inferior to the preceding, yet the defect is probably more than compensated by the quantity of herbage that they supply. Of these the principal are Alopecurus geniculatus; Milium effusum; Melica uniflora and nutans; Poa aquatica, fluitans, nemoralis; Festuca gigantea; Arundo phragmites, epigeios calamagrostis. Light sandy soils, especially the flat parts of the eastern and southern coasts, abound in grasses that are hardly to be met with in the interior of the island; the herbage of these affords a coarse and scanty pasture, and they are eminently distinguished from their kindred species, by the length and strength of their creeping roots. The inhabitants of Skey, and the other western islands of Scotland, manufacture them into durable ropes: and while growing, they serve the very important purpose of binding together the loose sand, which otherwise would be drifted far up the country: the most eminently useful for this purpose are Phalaris arenaria; Aira canescens; Arundo arenaria; Elymus arenarius, and Hordeum maritimum. Upon the sides and summits of our mountains, are found a few grasses that do not appear elsewhere, mixed with some others of more general occurrence; as, however, in these bleak and elevated situations, covered with snow for some months in the year, and shrowded in clouds for the principal part of the remainder, it would be scarcely possible for these plants to bring their seeds to maturity; we observe in them a wise and striking deviation from the common course of nature. Like the rest of their tribe, they throw up flowering stems and bear blossoms; but these are succeeded not by seeds, but by bulbs, which in a short time vegetate, and are already furnished with a leaf and roots, before they fall to the ground: all the viviparous grasses except one (Festucca vivipara) if transplanted to a lower and warmer situation, accommodate themselves to their new climate, and produce seeds. The following individuals compose this remarkable class, Phleum pratense; Aira cæspitosa; Poa aquatica alpina annua; Cynosurus cristatus; Festucca vivipara; Triticum repens. Besides these there are others of a more hardy constitution, which appear to be the true natives of the mountains, and multiply their species by seed in the usual way; of these the principal are Phleum alpinum, Poa flexuosa and cæsia. The rarer grasses may be divided into those which are found almost solely in corn-fields, and which probably have been imported from the Continent with seed-corn; and into those which are most certainly natives; to the first class belong all the five species of Panicum; Briza minor; Bromus arvensis: to the second belong Phleum crinitum; Alopecurus bulbosus; Agrostis spica venti; Sesleria cærulea; Stipa pumata.

Nearly allied to the grasses in general habit, are the eight genera, Schoenus, Cyperus, Scipus, Eriophorum, Juncus, Carex, Sparganium, and Typha, comprehending about ninety species. All these are natives of moors, bogs, and pools; they serve to give consistency to the deep mud or peat, in which they are rooted, and when young, afford a coarse pasture to sheep and cattle; several of them are used for matting, thatching, and for chair bottoms. The stately Typha (bull-rush) is one of the principal ornaments of our fens, and neglected pools, and the several species of Eriophorum (cotton-grass) enliven many a dreary mile of bog, by their gracefully pendent tufts of cotton. The follow-

ing are the rarer species belonging to this class, Cyperus longus (English Galangale) found only near St. David's Head, Pembrokeshire; Scirpus Multicaulis; Eriophorum alpinum; Juncus filiformis, biglumis; Carex cinerea distans.

PAPILIONACEOUS. The Leguminous, or papilionaceous plants, so called from their winged blossoms, form a very important class in British botany. They are divided into nineteen genera, and sixty-four species. The herbage of all when fresh, and of many when dry, is a most grateful food to horses, cattle, and sheep, and several of them, as the clovers and vetches, are largely cultivated for this purpose. Most of this class are climbers, and adorn our thickets and hedges with elegant festoons of blossoms and foliage; a few have been introduced into our gardens and shrubberies, as the Fumaria solida and lutea (Fumitory); Spartium scoparium (broom); and Lathyrus latifolius (everlasting pea); many more, however, even of superior beauty, have not yet found a place there; of these the principal are two species of fumitory, F. capreolata and claviculata; Lathyrus sylvestris (narrow-leaved everlasting pea), Vicia sylvatica and Cracca (wood and tufted vetch), plants eminently distinguished for their luxuriant growth, their elegant finely divided leaves, and their tufted blossoms. Of humbler stature, but yet of equal beauty, are Genista tinctoria and Anglica (dyers' weed and petty furze); Ulex nana (dwarf furze); Anthyllis vulneraria (kidney vetch); and Astragalus glycyphyllus (wild liquorice), with yellow flowers; Ononis arvensis (wrest harrow); Orobus tuberosus (heath pea); Hedysarum onobrychis (saint-foin) and Astragalus hyppoglottis (mountain milk vetch), with purple flowers; and the Lathyrus Nissolia, distinguished from the rest by its entire grass-like leaves, and its solitary crimson blossoms. Almost all the English papilionaceous plants flourish best in light calcareous soils, either rocky or sandy; and some of them, as the Anthyllis vulneraria, and Hedysarum onobrychis, may be reckoned certain indications of chalk or lime-stone. There are few rare plants belonging to this class; Fumaria solida and lutea; Pisum maritimum (sea-pea;) Lathyrus aphaca, hirsutis, and latifolius; Vicia hybrida, and Trifolium glomeratum, are the principal.

UMBELLIFEROUS. The umbelliferous plants form a large and important class in the natural arrangement of British vegetables, consisting of thirty-five genera, and about sixty species. The roots and seeds of those kinds which grow on dry, light soils, are frequently aromatic; those that are natives of marshes and moist meadows, are, for the most part, in a greater or less degree poisonous. The whole class, indeed, is a suspicious one, and contains species that are fatal, not only to man, but to most of our domestic quadrupeds. The most actively deleterious are the following: Conium maculatum (hemlock); Oenanthe crocrata (hemlock drop-wort); Cicuta virosa, (water-hemlock). A few species by dint of cultivation, have been rendered serviceable to man, either as food, or on account of their aromatic qualities; such are Daucus carota (carrot); Crithinum maritimum (samphire); Angelica major; Coriandrum sativum (coriander); Pastinaca sativa (parsnip); Anthenum fœniculum (fennel); Carum carui (carraway); and Apium graveolens (celery), a plant which in its native salt-marshes, is acrid

and of diminutive size, but by attentive culture becomes succulent, nutritive, and of high estimation. The vegetables belonging to this class are distinguished from the rest by their small clustered white or yellow flowers, produced at the extremity of a greater or less number of spokes, radiating from a common centre, like the sticks of an umbrella, a mode of inflorescence which distinguishes them at once from other plants, but disqualifies them from being ornaments to a garden; some of these, as Caucalis daucoides, and Anethum fœniculum, are certain proofs of a calcareous soil. The rarer species are Eryngium campestre (field Eryngo); Selinum palustre (milky parsley); Peucedanum officinale (sea sulphur wort); Cicuta virosa (water-hemlock), in wet places and salt-marshes; Tordylium maximum (great heart-wort); Caucalis latifolia (great bur-parsley); Athamanta Libanotis (mountain-stone parsley); Pimpinella dioica (dwarf rock-parsley), on lime-stone rocks, and chalk-hills; Meum Athamanticum (spignel), in high mountainous pastures; and Ligusticum Cornubiense (Cornish lavage), peculiar to the thickets and hedges of Cornwal.

LABIATED. The ringent, galeated, hooded, or labiated plants, hold a conspicuous place in the English Flora, and arrange themselves in the Linnæan system, according to the number and situation of their stamens, partly in the class of Diandria, and partly in the Didynamia; their blossoms are situated for the most part in whorls or rings, containing five or six individuals, and encircling the stem from the top downwards. Of these, none, except perhaps, the Digitalis (fox-glove), deserve to be ranked among the poisonous plants; a considerable, number, however, exhibit a strong aromatic smell, approaching, in some cases, to the fœtid, and possess other active sensible properties. Those which are at present used in medicine, are Teucrium scordium (water Germander); Mentha viridis (spear-mint); Mentha piperita (peppermint); Mentha pulegium (penny-royal); Marrubium vulgare (horehound), and Digitalis purpurea (purple fox-glove). Our most esteemed pot-herbs belong to this natural class, and are many of them natives of England. Such as (besides the mints mentioned above) Origanum vulgare (marjoram); Thymus serpyllum (common and lemon thyme); and Thymus acinos (basil thyme); all of them abundant in chalky and calcareous soils. There are not many very showy plants in this class; but the Galeopsis versicolor (been-ettle); Antirrhinum cymbalaria, linaria, and majus, (snap-dragon); and Digitalis (fox-glove, both purple and white), are eminently beautiful. The rarer species are Utricularia minor (small bladder-snout;) Salvia pratensis (meadow-clary); Ajuga Alpina (mountain-bugle); Mentha adorata (bergamot-mint); Bartsia Alpina (mountain eye-bright); Antirrhinum repens (blue toadflax); Scrophularia scorodonia (balm-leaved fig-wort); and Orobanche cœrulea (purple broom rape). Some of these plants have certain peculiarities of structure, which render them worthy of notice. The genus Utricularia (bladder-snout), an aquatic, may be distinguished from all the rest, by the numerous small membraneous bags, attached to its finely divided leaves that serve to support it on the surface of the water; the genera, Lathræa (tooth-wort); and Orobanche (broom-rape), are parasitical, that is, they fix themselves in the roots of other vegetables, from which they derive their nutriment, being incapable of sub-

sisting if planted in the open ground; they are also destitute of leaves, consisting merely of a fleshy stem, terminated by purplish brown flowers. The Antirrhinum linaria (yellow toad-flax), is occasionally subject to a singular variety, in the structure of its blossom, and when in this state, is known by the name of A. peloria. Thirty-six genera, and eighty-eight species, compose this class.

Liliaceous. Perhaps the most splendid of all the herbaceous plants, are those of the bulbous roots, which, from their general resemblance to the lily, have obtained the name of Liliaceous; most of these, however, are natives of warmer climates; the sandy deserts about the Cape of Good Hope, and the shores of the Indian Ocean, produce the most beautiful species; of those which are found wild in England, there are only eleven genera, and twenty-eight species; and the greater number of these are of rare occurrence in a truly native state; the spring and autumnal crocus, the snow-drop, the snow-flake, the three kinds of Narcissus (including the daffodil), the fritillary, tulip, and lily of the valley, as well as three species of ornithogalum, or star of Bethlehem, are more familiar to us as garden plants, than as natives of our woods and pastures. The rest of this class are seven species of Allium (garlick); three of Convallaria (Solomon's seal), Colchicum autumnale (meadow-saffron), and four kinds of Scilla (squill), one of which the beautiful and fragrant hare-bell, or wild hyacinth, is the principal ornament of our groves and thickets, at a time when they are profuse of beauties.

Rosaceous. The Rosaceous plants comprising the class Icosandria of Linnæus, form an important part of English botany, and include twelve genera, and forty-one species. Some of these are herbaceous, and others are deciduous trees and shrubs. In the first division, the most worthy of notice are, Spiræa ulmaria (meadow-sweet); growing plentifully by the side of brooks and ditches, and scenting the air about Midsummer, with its powerful cloying sweets; Fragaria vesca (wood-strawberry), perhaps the most valuable of our native fruits. Tormentilla officinalis (common tormentil), one of the strongest vegetable astringents. To the second division belong the most beautiful and valuable of our hedge-shrubs, the Prunus insititia, and spinosa (bullace and black-thorn); Mespilus oxyacantha (hawthorn); Pyrus malus and aucuparia (crab, and mountain ash); several species of Rosa (wild rose); and Rubus (bramble). The cherry, the medlar, the service, and pear-trees, whose fruit, when wild, is of so little account, and of such value when improved by cultivation, belong also to this class. The rarer among these plants are Pyrus domestica (service-tree); Spiræa salicifolia, (willow-leaved spiræa); Rosa rubiginosa (sweet-briar); Rubus Idæus (raspberry), in rocky woods; Dryas octopetala (mountain avens); Potentilla rupestris (strawberry flowered cinquefoil); Rubus chamœmorus (cloud-berry); Rubus saxatilis (stone-bramble); on the high mountains of Wales, and the north of England. The burnet-rose, and white beam tree, are certain indications of calcareous soil; and, indeed, almost the whole class thrive best on limestone.

Cruciform. The Tetradynamious, or cruciform plants, compose a large natural class, entirely distinct from each other, the indivi-

dual species, however, of which, have so many common features of resemblance, as to render it, in several cases, by no means easy to ascertain their specific differences. The flower consists of four petals, disposed in the form of a cross, containing one pistil and six stamens, two of which are shorter than the rest; these are succeeded by a pouch or pod, bearing the seeds, hence the class is divided into the pouched and podded plants. The taste of all these is more or less acrid, but none are poisonous: they are found to be peculiarly grateful to sailors who have been long at sea, and thereby have contracted the scurvy; on this account these vegetables have obtained the name of antiscorbutics; their hot biting flavour is the most intense in wet seasons, and in a swampy soil, and is remarkably mitigated by cultivation in light sandy ground. Many of our most esteemed culinary vegetables are of this class, such as the cabbage, with all its varieties of brocoli, cauliflower, &c. the turnip, the radish, mustard, cress, and horse-radish; twenty-three genera, and sixty-two species, compose this class. The most worthy of notice are the several kinds of Lepidium, or pepperwort; of Cochlearia, including the scurvy-grass and horse-radish; of Brassica, containing the colewort, field-cabbage, coleseed, turnip, and sea-cabbage; of Sinapis, including the white and common mustard; Bunias catuile (sea-rocket); Crambe maritima (sea-kale); Sisymbrium nasturtium (water-cress); and Erysimum alliaria (sauce alone); all these are wholesome and agreeable vegetables, either in sallads or boiled. Isatis tinctoria (woad), is worthy of mention, as a dying drug, anciently used by the Britons for the purpose of staining their skins, and in some estimation even at present, as a substitute for indigo. The few rare plants belonging to this class are, Vella annua (annual cress-rocket); Sisymbrium monense (sea-rocket), in sandy-soils; Draba incana (wreathed cress); Iberis amara (bitter candy-tuft), on limestone; Thlaspi arvense (smooth Mithridate mustard), in clay; Cochlearia Danica (Danish scurvy-grass), in mud by the sea-side. The only native cruciform plant adopted into our gardens, is Cheiranthus cheiri (wall-flower); if, indeed, it be not rather to be considered as of foreign origin.

Radiated. One of the largest of the natural classes of English vegetables, is that of the radiated or compound flowered plants; these bear flowering heads, consisting of numerous florets, inclosed in a common calyx, and seated on the same receptacle; each fertile floret is composed of a tubular, or strap-shaped petal, and five stamens, the anthers of which are united into a hollow cylinder, through which rises the pistil; this is followed by an oblong seed, terminated by a small column, crowned by a radiated feather; by this ingenious apparatus, when the seed is ripe it detaches itself from the receptacle, and is carried in the air to a considerable distance, and is on this account called a winged seed. Forty genera, and one hundred and twenty species, belong to this class. It is rather remarkable, that out of so large a number of plants, many of which are very abundant, and of great size, only a single one, the Tragopogon porrifolius (salsafy), should be applied to the sustenance of man, and not even a single one should be cultivated for the use of cattle; more especially as the Lactuca virosa (strong scented lettuce), is the only species possessed of

deleterious properties. Most of this class have an ungrateful bitter taste, and the succulent ones contain a white milky juice, of an acrid flavour. Of all our native vegetables, they are the commonest, thriving by neglect, and multiplying under persecution; the farmer and gardener are unceasingly employed in their destruction, for they contribute little or nothing to the support of man, and the larger quadrupeds; nor is the beauty of their appearance such, as to obtain for them a place in the flower-garden. The annual kinds, however, producing vast multitudes of seeds, and the perennial ones being furnished with long and deeply striking roots, there is no fear of their extermination; they occupy road sides, ditch banks, and all waste places that are incapable of cultivation, and seem peculiarly devoted to the sustenance of the granivorous birds, by their seeds, and of numerous tribes of insects, by their foliage. The sow-thistle, hawkweed, burdock, thistle, cud-weed, coltsfoot, groundsel, dandelion, daisy, and yarrow, are the most commonly occurring genera; a few, as the chamomile, wormwood, elecampane, and feverfew, are employed in medicine. The daisy, and butter-bur (Tusillago petasites), are generally the first blossoms of the spring, and on that account are beheld with greater satisfaction than more showy plants. The rarer individuals attached to this class are, Hieracium alpinum (alpine hawkweed), and Serratula alpina (alpine saw-wort), found in Wales; Crepis fœtida (stinking hawkesbeard), in calcareous soil; Santolina maritima (sea-cotton weed); Artemisia cœrulescens (blue southern-wood), on the sea-shore; Artemisia campestris (wild southern-wood); Gnaphalium Gallicum (grass cud-weed), on light sandy ground; Senecio paludosus (marsh golden-rod); Inula Helenium (elecampane), in marshes, ditches, and wet meadows.

Orchis. The greatest part of the class Gynandria in the Linnæan system of English plants, is occupied by the Orchis tribe, consisting of five genera, orchis, satyrium, ophrys, serapios, and cypripedium. These differ remarkably in structure from the rest of our native vegetables; they are bulbous or tuberous-rooted, have entire sword-shaped leaves; each root throws up a single stem, terminated by a loose, or crowded spike of blossoms; the blossoms themselves consist of five petals, generally disposed so as to resemble a fly, bee, spider, or other insect; of two stamens seated upon the pistil of a nectary or honey-cup, lengthened into a horn, or distended like a bladder; the seeds resemble brown coarse dust, and though repeatedly sown, have never yet been known to germinate. They are all either singular or beautiful plants, and would no doubt be more frequently introduced into our gardens, if they were of easier cultivation. They are of but little account as food for cattle, but the roots of the bulbous kinds abound in a mild farina, which might be used for human nutriment; the jalap of the shops is the powdered root of a species of orchis that is found in Turkey. The number of English species belonging to the above-mentioned genera, is about thirty-two; of these the Ophrys anthropophora (man orchis); Ophrys myodes (fly orchis); Ophrys apifera (bee orchis); Ophrys aranifera (spider orchis), are the most singular for the form of their blossom, the general appearance of which is expressed by their trivial names. The most eminently

beautiful kinds are, Orchis pyramidalis (late flowering orchis); Orchis mascula (early orchis); Orchis conapsea (red-handed orchis); Satyrium hircinum (lizard flower); Serapias grandiflora (white helleborine); Cypripedium calceolus (ladies slipper). A few are remarkably fragrant, especially in the cool of evening; these are Orchis bifolia (butterfly orchis); Orchis conapsea; Ophrys monorchis (musk orchis). Several grow in wet boggy places, but by far the greater part are inhabitants of calcareous districts; the county of Kent in particular, is remarkably rich in them.

TREES. Such of our trees and shrubs as have not been already mentioned, may be considered as forming a peculiar class, and one of great importance; it is naturally subdivided into the evergreen and deciduous.

EVERGREENS. The most valuable of our native evergreens, are the box, the pine, the yew, and the holly; those of secondary consequence, are the juniper, and ivy; the spurge laurel (Daphne lauriola); the cranberry, and those extremely ornamental plants, the Vaccinium vitis idæa (red whortle berries); and Arbutus uva ursi (bear-berry).

DECIDUOUS. The deciduous timber trees that are either aboriginal, or at least have been long naturalized to our soil, are the oak, the chesnut, and beach, all of which are *mast-bearing trees*, or produce farinaceous oily nuts, the favourite food of hogs, and of many graminivorous quadrupeds; the birch, the alder, the hornbeam, the abele, the black poplar, and the aspen, bearing catkins; the sycamore, the maple, and the ash; the lime, the elm, and wych hazle. A middle station between the timber-trees and shrubs, is occupied by the hazle, and the numerous species of willow. The pulpy fruit-bearing shrubs are, the currant and gooseberry, (Ribes,) the elder, the barberry, the bilberry, the cornel, or dogwood, the buckthorn, and berry-bearing alder, (Rhamnus,) the guelder rose, and mealy-tree, (Viburnum,) and the Mezereon; the four first are wholesome and grateful to the palate, the rest are either insipid or noxious. The four kinds of Erica (heath), and Andromeda polifolia (Poley mountain), are low, shrubby plants, that form the most splendid ornaments of our bogs and moors.

FERNS. The Filices or ferns, comprize a number of elegant plants that grow in moist, shady and uncultivated places, the uses of which have been but little inquired into; eleven genera, and about forty-four species, are natives of Britain; the roots of most abound in a mild sweetish mucilage, which in times of scarcity has been resorted to for nutriment; the larger and commonest kinds, such as Pteris aquilina (common fern or brakes,) are collected and burnt for the potash, which is yielded from their ashes; the Equisetum hyemale (shave-grass), is much used by turners and cabinet-makers, as a fine file to smooth their work with.

MOSSES. The smallest of vegetables, the mosses, are at the same time the most numerous; ten genera, and nearly two-hundred species, compose this natural class. To man and the larger animals, they appear to be of little or no use; low and shady places are in general over-run with them, and on walls, and hard dry banks, where other

plants are unable to vegetate, these readily gain a settlement; by the decay of successive generations, a sufficient depth of soil is at length formed for the nutriment of other vegetables, and this is, perhaps the principal advantage derived, at least by man, from the existence of these plants.

LICHENS. Those crustaceous, and leather-like plants, which cover the sides of walls and rocks, and abound on dry heaths, form the class of lichens, nearly as numerous as the preceding one; their general use in the economy of nature, seems to be nearly the same as that of the mosses; the ingenuity of man has, however, applied them to several other purposes. The Lichen pulmonarius, has gained the name of lungwort, from its supposed use in medicine; Lichen Icelándicus, when boiled in water or milk, produces a kind of gruel of little account in this country, but in Iceland forming an important part of the food of the inhabitants; the Lichen prunastri, serves as the base of several scented powders; that beautiful but fugitive crimson dye, the archil, is prepared in England from the Lichen parellus, and L. calcareus (Dyer's lichen). Several others are employed by the peasants of Wales, Derbyshire, and the North of England, in dying their home-made woollen cloths.

FUNGI. The class of Fungi includes seventeen genera, and several hundred species of native vegetables, almost all of which are abandoned to neglect; in France and Italy, several kinds are collected for the table, and are reckoned some of its principal delicacies; in this country they lie for the most part under the obloquy of being poisonous, so that only the five following are used, viz. Merulius chantharellus (Chanterelle mushroom); Agaricus oreades (Fairy-ring M.); Agaricus campestris (common M.); Phallus esculentus (Morell); and Tuber cibarium (truffle).

SEA-WEEDS. The last class of English vegetables, is that of the marine Algæ, or sea-weeds. Four genera, and between two and three hundred species, are found upon our own shores; the more tender and gelatinous kinds, are eaten either raw or boiled, and the rest on those rocky parts of the coast, where they can be collected in great quantities, are burnt into kelp for the use of the soap-boilers and glass-makers.

ZOOLOGY. Mr. Pennant in his British Zoology, has treated this subject at due extent, and with his usual ability. The nature of this work will only admit of a few imperfect notices. Of animals, that celebrated author enumerates twenty genera, form the horse down to the seal and bat. The birds extend to forty-eight, the reptiles to four, and the fish to forty genera, besides the crustaceous and shell fish.

That noble and useful animal, the Horse, is found in England of many mingled breeds, while most other kingdoms produce only one kind.* Our race-horses descend from Arabian stallions, and the genealogy faintly extends to our hunters. The great strength and size of the English draught-horses, are derived from those of Germany, Flanders, and Holstein, and other breeds have been so intermingled, that native horses may be found adapted to every purpose of pomp, pleasure, or utility. Those of Yorkshire are particularly celebrated for their spirit

* Pennant's Zoology, vol. i. p. i.

and beauty; and the grooms of that country are equally noted for their skill in the management of this valuable animal. It is somewhat remarkable, that while England excels all the European countries in various breeds of horses, yet veterinary schools are of recent institution. The speed of Childers was computed at a mile in a minute; and such is the strength of a Yorkshire pack-horse, that he will usually carry four hundred and twenty pounds; nay, a mill-horse will support for a short distance, a weight of nine hundred and ten pounds. Mr. Pennant observes, that though the British cavalry was remarkable, even in the time of Julius Cæsar, yet we know not what was the primitive breed.

The indigenous breed of horned cattle, is now only known to exist in Neidwood forest, in Staffordshire, and at Chillingham-castle, in Northumberland. They are long-legged and wild like deer, of a pure white colour, with black muzzles, ears, and tails, and a stripe of the same hue along the back. The breeds of our cattle are almost as various as those of our horses; those of Wales and Cornwal are small, while the Lincolnshire kind derive their great size from those of Holstein. In the north of England we find kylies, so called from the district of Kyle, in Scotland; in the south we find the elegant breed of Guernsey, generally of a light brown colour, and small size, but remarkable for the richness of their milk. Of late years Mr. Bakewell, and others, have brought the breeding of cattle and sheep to a regular system.

The number and value of sheep in England, may be judged from the ancient staple commodity of wool. Of this most useful animal several breeds appear, generally denominated from their particular counties or districts: those of Herefordshire, Devonshire, and Cotswold downs, are noted for fine fleeces, while the Lincolnshire and Warwickshire kind, are remarkable for the quantity. The Teesdale breed of the county of Durham, though lately neglected, continue to deserve their fame. The wool is beautiful, but the length of their legs, lessens their value in the eyes of the butcher. The mutton of Wales, on the contrary, is esteemed, while the wool is coarse, yet employed in many useful and salutary manufactures. The Norfolk breed is remarkable for black faces and legs. Those of Leicestershire are very large, and without horns.

The most laudable exertions have lately been made by the Board of Agriculture, and by individuals, for the improvement of the English fleece.

The goat, an inhabitant of the rocks, has, even in Wales, begun to yield to the more useful sheep; that country being, like Scotland, more adapted to the woollen manufacture. It is to be regretted that some means are not discovered of preventing the goat, an useful animal to the poor, from being so destructive to plantations and agriculture. The breeds of swine are various and useful.

England also abounds in breeds of dogs, some of which were celebrated even in Roman times. In the reign of Elizabeth, Dr. Caius or Kay enumerates sixteen denominations of English dogs. Some seem to be now extinct; and the blood-hound only occurs in Staffordshire. The terrier, as the name implies, was used to force the burrowing ani-

mals from their holes; the harrier, a-kin to the fox-hound, for hunting the hare. The grey-hound was so called, as Caius informs us, because he was the first in *degree* among dogs. The tumbler of that author seems to be our lurcher. The spaniels from Spain, as the name imports, were trained as starters, setters, and pointers, but the latter description is modern; the water-spaniel was used to recover the slaughtered game; the spaniel gentle, or comforter of Dr. Caius, is our lap-dog; the shepherd's dog is Buffon's fanciful father of the whole canine progeny, and always displayed its docile qualities. The mastiff, or *amaze-thief*, was employed in defending the house: to this species Mr. Pennant ascribes the bull-dog, an animal of surprising spirit and fierceness. The curs and mongrels are numerous; but the turnspit is now exploded. Of late the Newfoundland-dog, of more useful and generous qualities, has, in some degree, supplanted the mastiff; and the spotted Dalmatian forms an additional attendant on an equipage.

The cat is one of the most universal, and most identic of animals, those of Angola excepted, with their white fleeces, and those of Russia with a bluish fleece, and eyes of topaz.

Of our savage animals the most fierce and destructive is the wild cat, which is three or four times as large as the domestic, with a flat broad face, colour yellowish white, mixed with deep grey, in streaks running from a black list on the back; hips always black, tail alternate bars of black and white; only found in the most mountainous and woody parts. The wolf has been long extinct, but the fox abounds. It is sufficient to name the badger, the fichet, the martin, the stoat, or ermin, the otter, squirrel, dormouse, rat (the native or iron grey, has lately almost vanished before the brown kind of India, falsely called the Norway rat), and various kinds of mice. The mole, urchin, and bat, seem to become more rare; the seal is chiefly found on the coast of Wales.

In the parks of the great, the roe is now extinct, but fallow deer abound, of great beauty, and the red deer; the latter are known by the terms, stag, hind, young, or calf; while the former are styled buck, doe, and fawn; the red kind are more vicious than the other, and becoming more uncommon.

The chief of our birds of prey, are the golden eagle, sometimes found on Snowden; the black eagle has appeared in Derbyshire; the osprey, or sea eagle, seems extinct in England. The peregrine falcon breeds in Wales; and many kinds of hawks in England. An enumeration of the other birds would be superfluous. The nightingale, one of the most celebrated, is not found in North Wales, nor any where to the North, except about Doncaster, where it abounds; nor does it travel so far west as Devonshire and Cornwal*. This limitation is remarkable, as these birds are found in the severe climate of Sweden. Our poultry seem to originate from Asia; our peacocks are from India; our pheasants from Colchis; the guinea-fowl (the Meleagrides, or Numidian hens of the ancients) are from Africa. Our smallest bird is the golden-crested wren, which sports on the highest pine trees; and our largest the bustard, some of which weigh twenty-five pounds,

* Pennant's British Zoology, I. p. 360.

and are found in the open countries of the south and east. But this bird seldom appears; and our turkeys, originally from America, richly supply the defect; the largest are reared in Norfolk and Suffolk. One of the most singular of our water-fowl is the long-legged plover: the most useful, the mallard or wild duck, which is chiefly caught in the fens of Lincolnshire: the numbers sent to the capital, almost exceed credibility.

The reptiles are the coriaceous tortoise, frogs, toads, several kinds of lizards: of our serpents the viper alone is venomous; other kinds are the ringed snake, sometimes found four feet in length; and the blind worm, seldom exceeding eleven inches.

Of fish, the whale seldom appears near the English coasts, nor the dolphin; the porpoise, and others of the same genus are not uncommon. The basking shark appears off the shores of Wales. Numerous are our edible sea-fish. Some of the most celebrated are the turbot, doree, soal, cod, plaice, smelt*, mullet, &c. &c. The consumption of herrings and mackarel extends to most parts of the kingdom; but pilchards are confined to the Cornish coasts. Our chief river fish are the salmon and the trout, which are brought from the northern parts in prodigious numbers, generally packed in ice; but sometimes the trout are brought alive, in vessels provided with a well or bason for that purpose. It is said that not less than 30,000 salmon are brought from one river, the Tweed, to London, in the course of a season. The lamprey, though a sea-fish, is chiefly found in the Severn; it resembles the eel, but has a line of seven apertures near the head. The charr is chiefly found in the lakes of Westmoreland, the sides sprinkled with red spots. The umber, or greyling, somewhat resembles the trout. The samlet is the smallest of the trout kind, and has erroneously been supposed the young of the salmon; in Scotland it is called the par. Our carps are from Poland, and the inferior sort from Prussia: the tench and perch are esteemed by some as dainties of the table.

The lobster is found on most of the rocky coasts, particularly off Scarborough. This crustaceous fish has singular habits; with its blunt claw it maintains its situation, while that with serrated pincers divides its food: the claws are reproduced, though not so large as the first; they change their shells every year. The craw-fish is a small kind of lobster, which dwells in the clayey banks of rivers. Of shell fish, the pearl mya, a large kind of muscle, was found in the Conway, in Wales, and the Irt, in Cumberland; but it seems now confined to Ireland and Scotland. Pearls arise from the perforation of a kind of worm, and may be produced artificially, by boring the shell, and replacing the mya in the water†. The English oysters maintain their Roman reputation; but they seem to yield in flavour to those of more northern countries. The green from Colchester, in Essex, and the juicy white from Milton, in Kent, have the chief reputation.

MINERALOGY. It seldom or never happens that countries, abundant in the productions of agriculture should, at the same time,

* Mr. Pennant, iii. 371. supposes white bait to be the young of the bleak.
† Pennant, Br. Zool. iv. 80. St. Fond, ii. 190.

present an opulent mineralogy. Yet England is far from being deficient in this respect.

The tin mines in Cornwal have been already mentioned; and they are not only venerable from their antiquity, but are, it is supposed, the richest of the kind in the world. Tin is also found in Bohemia, Saxony, and Hungary, and in the Oriental regions of Malacca, Banca, and Siam, but not in such lasting exuberance as in the Cornish mines. That kind of silver, termed by mineralogists horn-ore, is also found in that district; but the profound secrecy observed in working it, forbids any investigation of the amount. The Huel rock boasts of what is called bell-metal ore; and of wolfram*.

Cornwal also produces copper at Redruth, Alstone, and the Land's End. The same metal is found in Yorkshire, and Staffordshire; but nowhere in such abundance as in the Parrys mountain, in the north-west of Anglesea†. Instead of descending in veins through various rocky strata, the usual form of metallic ores, it here forms a prodigious heap, and is worked in the manner of a quarry. The mountain is almost bare of shrubs or grass; and is covered with aluminous slate, under which, in grey chert, is the ore, being chiefly the yellow sulphurate, which yields a quarter of copper, and a quarter of sulphur, the remaining half being refuse. This valuable mine was discovered about thirty years ago.

Lead is found in the Mendip-hills, Somersetshire; which also produce calamine and manganese. The lead-mines in Derbyshire are well known, not only for that metal, but for the beautiful veins of fluor, which accompany it, and which is manufactured into several ornamental articles. In general the northern central ridge of mountains, abounds with lead-ore. The lead mines of Aldston, on the eastern verge of Cumberland, employ about eleven hundred men.

No metal is so widely diffused through the globe as iron; and England not only contains excellent mines, but excels all nations in the variety of fabrication. The most remarkable mines of iron, are those of Colebrook-dale, Shropshire; Dean-forest in Gloucestershire; with some in the north of England, particularly near Ulverston, in Lancashire.

Among the minor metals, zinc, in the form of lapis calaminaris, and blend, is found in Derbyshire, Cornwal, and other regions. Nickel and arsenic sometimes appear in Cornwal; and recently, what is called menachanite. But one of the most important of this kind is plumbago, or black lead, which is found in the ridge of Borrowdale, near Keswick, in Cumberland: the mine is only opened at certain intervals of time.

Gold has been discovered in various quarters of England, particularly near Silsoe, Bedfordshire; but the metal has never recompensed the labour and expense‡. The real gold mines of England are those of

* Mr. Maton informs us, that *Huel* (pronounced Whele) means a *mine*; that the tin pebbles form strata, in bluish marl, mixed with sand and marine spoils; and the richest mine is at Polgooth, two miles S.W. of St. Austle. (Western Tour.) *Opal* is found in yellow copper ore at Roskeir, Ibid.

† Aikin's Wales, 133.

‡ Gough's Camden i. 330.

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coal, found in the central, northern, and western parts, but particularly in the northern, around Newcastle. This substance is a mixture of carbon with bitumen, which last abounds in the Newcastle coal, and is the cause of its coalescing when inflamed *. An ingenious traveller has ascribed the whole opulence of England to her coal, as being the very soul of her manufactures, and consequent commerce †. The coals of Whitehaven and Wigan are more pure; and the cannel and peacock coals of Lancashire, are so beautiful, that they are suspected by some to have constituted the *gagates*, or jet, which the ancients ascribed to Britain ‡. A singular species of coal is found in Bovey-heath, Devonshire, resembling wood impregnated with bituminous matter. Turf or peat is common, even in Hampshire, and other southern counties.

Salt Mines. The mines of rock salt, in Cheshire, must not be omitted. They appear to have been known to the Romans, as a place called *Salīnæ* is here mentioned by the geographer of Ravenna. Leland has described them in the time of Henry VIII; nor were they unknown even in the Saxon periods. Those of Northwich are the most remarkable: at Namptwich and Middlewich, are only salt-springs; and others occur at Droitwich, in Worcestershire, and Weston, in Staffordshire. The immense mines on the south side of Northwich, were discovered about the beginning of this century. The quarries, with their pillars and crystal roof, extending over many acres, present a beautiful spectacle; the stratum of salt, lies under a bed of whitish clay, at the depth of about forty yards. The first stratum is about twenty yards thick, so solid as to be blasted with gunpowder, this salt resembles brown sugar-candy. Next is a bed of hard stone, under which is a second stratum of salt, about six yards thick, some parts brown, others as clear as crystal. The Witton pit is circular, 108 yards in diameter, the roof supported by twenty-five pillars, each containing 294 solid yards of rock salt; the whole covering near two acres of land. The annual produce of rock salt at Northwich has been estimated at 65,000 tons; of which about two thirds used to be exported to Flanders and the Baltic||.

Marbles, and free-stone, or calcareous sand-stone, of various colours and textures, also occur; the most celebrated of the latter are those of Portland, Purbeck, &c. Fine alabaster appears in Derbyshire; fullers-earth in Berkshire, and some other counties.

Mineral Waters. Nor is England less productive of mineral waters, of various properties and descriptions. Those of Bath have been celebrated since the Roman times. Next to that place of fashionable resort, may be mentioned the hot-wells of Bristol, those of Tunbridge in Kent, and of Buxton and Scarborough in the North. Those of Cheltenham in Gloucestershire, have been esteemed benefi-

* Kirwan's Min. II. App. The Bristol coal, so abundant at Kingswood, burns more rapidly than that of Newcastle.

† St. Fond.

‡ True jet is said to be found in Lincolnshire; it abounds in the south of France, and north of Spain, being palpably ancient timber.

|| Pennant's Journey from Chester to London, p. 26. (He estimates the duty at 20,000*l.*) Gough's Camden, ii. 436. Aikin's Manchester, 427.

cial in scorbutic cases: but to enumerate the springs of inferior note, would be infinite, as chalybeate wells at least, must occur in almost every county, and new waters are daily starting into celebrity.

NATURAL CURIOSITIES. Among the natural curiosities, those of Derbyshire have always been esteemed the most memorable. Hobbes and others have long since celebrated the wonders of the Peak, a mountain not equal in height to those of Wales, or the more northern part of England, but perforated with such vertical chasms, and such surprising caverns as have deservedly excited admiration. These caves are often intersected by subterraneous waters; and mineralogists seem to ascribe their formation to this cause, the rock being of calcareous stone. These subjects have now become too trite and familiar to allow further description; and it shall only be observed, that the cavern at Castleton, now decently called Peak's hole, is of a vast extent and presents singular aspects, while Poole's hole, near Buxton, is celebrated for its lofty roof, and curious stalactites. Near Eyam is Bamforth hole, a stalactitic cavern of considerable extent*.

Other remarkable caverns are found in the northern ridge of English mountains. In the vale of Kingsdale, on the western extremity of Yorkshire, is Yordas cave, which presents a subterraneous cascade; this cave is about fifty yards in length. But the most noted is Wethercot cave, not far from Ingleton. It is surrounded with trees and shrubs, in form like a lozenge, divided by an arch of lime-stone, passing under which you behold a large cascade, falling from a height of more than twenty yards; the length of this cave is about sixty yards, the breadth thirty. The vast limestone base of Ingleborough, is perforated in all directions like a honeycomb. It is the River Wease, or Greta, which pervades the cave at Wethercot, and another at Gatekirk, and runs not less than two miles under ground. This stream must not be confounded with the Greta, which falls into the Tees near Barnard-castle, and rises near Brough, in Stanmore; two rivers, the Ouse and the Swale, running betwixt them. Among other curiosities in this neighbourhood, must not be omitted Hurtlepot, a round deep cavity, near forty yards in diameter, almost surrounded with rocks, about thirty feet perpendicular, above its black waters, while the overbranching trees increase the horrors of the scene†. Not far to the south-east, is a lake called Malham Tarn, of clear and very cold water, abounding in trout. This is the source of the river Aire, which runs about a mile under ground; and near it is Malham cove, a kind of amphitheatre, of smooth perpendicular limestone, about 280 feet high in the centre. The river Ribble, near its origin in these parts, also sinks into a deep cavern; and silently pervades the mountains for about three miles. Near Settle, at the bottom of some calcareous rocks, is one of the most remarkable ebbing and flowing wells in the kingdom‡. This district also abounds with rare and curious

* Aikin's Manchester, p. 76. St. Fond, tom. ii.

† West's Guide to the Lakes; and a curious pamphlet on the caves of Yorkshire, 1781, 8vo. By Housman's Map, this Greta passes by Ingleton to the Lon and Lancaster.

‡ Aikin's Manchester, p 91.

plants: and in the grand features of nature, exceeds any other region in England or Wales*.

The lakes of Cumberland form another grand scene of attraction, but it would be idle to attempt to depict, in a few words, beauties which have been described by so many authors, and particularly by the glowing pencil of a Gray. Suffice it to observe, that the three most celebrated lakes are those of Coniston, Windermere, and Derwent. The beauties of the first have been compared to the delicate touches of Claude; the noble scenes of the second, to those of Poussin; while Derwent has much of the sublime mildness of Salvator Rosa; but most travellers esteem Ulswater, the most truly sublime.

The mountainous regions of Wales may well be supposed to present many natural curiosities; and the Parrys mine in Anglesea, is in itself a surprising object. The cataracts in Cumberland are rivalled by a remarkable fall of the Tees, on the west of the county of Durham, over which is a bridge suspended by chains, seldom passed but by the adventurous miners; nor must Asgarth force, in Yorkshire, be passed in silence.

Near Darlington, in the county of Durham, are three pools of great depth, about thirty yards, called Hell Kettles, concerning which many fables have been current, as is usual with all nations, concerning any natural phœnomena. The cliffs near Sunderland consist of a singular stone, resembling coraline productions; and so firm as to be generally used there in building †.

The sub-marine relics of a forest, on the coast of Lincolnshire, may be deservedly classed among the most remarkable natural curiosities. Nor are the lofty chalk cliffs of Dover without their claim. The cavern near Ryegate, in Surry, descending through a hill of the finest and most splendid sand, must rather claim an artificial origin. At Brosely, in Shropshire, was a well so impregnated with bitumen, that, on the application of a candle, the stream took fire, and would boil a tea kettle in nine minutes ‡; but, by opening other coal-pits in the vicinity, this phenomenon disappeared; a similar appearance and event also occurred in Lancashire ||. But Shropshire still contains a remarkable well of bitumen, at a place thence styled Pitchford. Cheddar cliffs, in Somersetshire, may also be mentioned among the natural curiosities; and the Mendip-hills, are not without their caverns, particularly Wookey-hole, near Wells, a stalactitic cavern of about six hundred feet in length, divided by low passages, into various apartments; one of which, called the hall, somewhat resembles a Gothic

* Mr. Housman also gives a good account of these curiosities, he observes, p. 26, that rocks are in Cumberland called *Linns* (whence the name is in Scotland applied to a cataract); and Sour Milk Force, near the bottom of Buttermere lake, is supposed to fall upwards of 300 yards. A curious cave was lately discovered, p. 83, by miners near Cross-fell, said to be two miles in length, and full of splendid spars. Gordale Scarr, p. 199, near Malham cove, is a dreadful rent through high rocks, worthy of the attention of a curious traveller.

† The like stone occurs in Ingria, and the palace of Peterhoff is constructed with it. The Ammonitic Stone of Broad Marston, Somersetshire, is another singular production.

‡ Phil. Trans. No. 334. and 482. || Gough's Camden, ii. 397. 412.

chapel, and is said to be eighty feet in height; while the furthest, styled the parlour, is of moderate height, but extensive diameter. On the N. W. side of the Mendip-hills, is a yet more remarkable curiosity, a considerable cavern, at the bottom of a deep ravine, near the little village of Berrington, or Burrington. Here are a number of human bones, gradually incorporating with the lime-stone rock; there being a continual dripping from the roof and sides, which deposites a stalactitic sediment on the bones. Several nodules contain perfect human skulls. At the further end, where the height is about fifteen feet, there is a large conic stalactite, which nearly meets a pillar rising from the floor. This cave was only discovered about two years ago; and as the matter increases so fast, it is conjectured that it would soon have been closed up*. Hence it is probable that these bones are of no remote antiquity, and may, perhaps, be the remains of some wretches who had here taken shelter from the cruelty of Jefferies, after the insurrection of Monmouth†.

* Transact. of the Linnæan Society, vol. v. Philosoph. Mag. vii. 146.

† There is a remarkable cave, or rather pit, supposed to have been an ancient mine, called Pen-park hole, about five miles to the north of Bristol. A pamphlet, published by Mr. Catcott, contains the dimensions of this horrible chasm, and an affecting account of the fate of Mr. Newnam, who fell into the gulph while he was measuring the depth.

ENGLISH ISLES.

ISLE OF WIGHT. IN the Southern, or English Channel, first appears the Isle of Wight, by the Romans called *Vectis*, by the Saxons *Vihtlond*, of an oval form, about twenty miles in length, and twelve in breadth. This isle is fertile and beautiful, and decorated with many picturesque villas; the principal haven is that of Newport. The chief mineral products are pipe-clay, and fine white sand, for the fabrication of pure glass; and at Alum-bay, on the north side of the Needles, are found considerable quantities of native alum*. It is said that more corn was once raised in the Isle of Wight in one year, than the inhabitants could consume in eight. One of the most remarkable buildings is Carisbrook-castle, where Charles I was imprisoned; it was built soon after the conquest, as appears from the Book of Doomsday. The lofty white rocks, styled the Needles, seem to have been disjoined frem the western extremity of the isle, by the violence of the waves. There were formerly three; but about the year 1782, the tallest, which rose about one hundred and twenty feet above the low-water mark, was overthrown, and totally disappeared †.

At the distance of about seventy miles from Wight, to the S. W. arises the little isle of Alderney, off the Cape la Hogue; which is afterwards followed by the more important isles of Guernsey and Jersey; Sark being a small isle interposed between the two latter.

GUERNSEY. Guernsey the largest of these isles, is twelve miles long, nine broad, and about thirty-six in circuit. It is a verdant isle, though the soil be hilly, and barren of wood. The only town is that of Port St. Pierre ‡.

JERSEY. Jersey is about twelve miles in length, and six in breadth, a well watered and fertile island, producing excellent butter and honey. The winters are milder, but more windy, than those of England. The breed of sheep, with four or six horns, seems now unknown. The northern side of the island is high, but the southern subsides into pleasant vales, covered with orchards. It is said that this

* Goughs Camden, i. 143.
† Worsley's Isle of Wight. p. 274.
‡ Guernsey is chiefly remarkable for its small breed of cattle.

isle has sometimes produced in one year 24,000 hogsheads of cider. The remarkable places are the two towns of St. Hellier and St. Aubin, both standing on a bay, opening to the south; and the castle of Mont Orgueil. The inhabitants of Jersey are computed at 20,000, of which 3000 are capable of bearing arms. In January 1781, St. Helier was surprised by eight hundred French, under Rullicourt, who was killed, while Major Pierson fell on the side of the English, his valour being commemorated by paintings and prints, and by a handsome monument in the church of St. Helier.

ALDERNEY. Alderney is a small isle, with a town, and about one thousand inhabitants in all. Sark has about three hundred inhabitants *.

EDDISTONE. Returning to the English shore, we first descry Eddistone light-house, beat by all the fury of the western waves. This edifice has repeatedly been overthrown, but the present erection by Mr. Smeaton, composed of vast masses of stone, grooved into the rock, and joined with iron, promises alike to defy accidental fire, and the violence of the ocean, though the waves sometimes wash over the very summit in one sheet of foam.

SCILLY. About thirty miles to the west of the Land's End, appear the Isles of Scilly, which have been idly deemed the Cassiterides of the ancients, though these rocks be too minute to have attracted their notice. This cluster pretends to the name of one hundred and forty-five isles, covered with grass or moss, besides innumerable dreary rocks. The largest isle is that of St. Mary, which is about five miles in circuit, and has a castle and garrison: inhabitants about six hundred. That of St. Agnes is rather fertile, inhabitants about three hundred. The whole inhabitants of the Scilly Isles, are computed at about one thousand. The cattle and horses small; but sheep and rabbits thrive well. Considerable quantities of kelp are prepared amid these rocks †.

LUNDY. On turning to the north, first appears the little isle of Lundy, situated in the Bristol Channel, about three miles long, but not a mile in breadth, with about 500 acres of good land, some rivulets, and a castle. It was formerly a noted retreat for pirates.

ANGLESEA. Some small isles lie off the Welch coast of Pembrokeshire and Caernarvon, such as Caldy, Skomar, Bardsey, and others ‡: but the isle of Anglesea deserves more attention, being the Mona of Tacitus, while the isle of Man is more properly the Monæda of the ancients. Anglesea is about twenty-five miles in length, and eighteen in breadth. The chief towns are Newburgh, Beaumaris, and, on the western extremity, fronting Ireland, Holyhead. This isle is so remarkably fertile, that the Welch have emphatically styled it the mother of Wales; and of late has also been productive of rich copper, found in the Parrys mountain, in the N. E. part of the island, near Amluch, of which an account has been given in treating of the

* Gough's Camden, iii. 753.

† Gough's Camden, iii. 753.

‡ Barry, a small isle, S. W. of Cardiff, is latterly noted for sulphate of strontian, also found at Old Passage, fourteen miles N.W. of Bristol, and near Mendip-hills.

English minerals. This isle also produces green serpentine, with asbestos. Beaumaris is a large town, with a castle built by Edward I. Newburgh is a corporation of smaller moment. Holyhead, originally a fishing town, has become of consequence, by the Irish packets which pass daily, the average time being twelve hours.

MAN. The last English isle worth mention is that of Man; it is about thirty miles in length, and fifteen in its greatest breadth. In the midst is a high mountain, called Snafel. The chief mineral productions are black marble, slate, lime-stone, lead, copper, and iron. Man is also well stored with black cattle, and sheep; and the population has of late years greatly increased. This isle was seized by the Norwegians, along with the Western Isles of Scotland, in the ninth century; and remained under these lords an independent kingdom, till the thirteenth century, when it fell with those islands, to Alexander III of Scotland. The Scots were expelled in the reign of Edward II, but the title continued dubious, for in the fifteenth and sixteenth centuries, Alexander and John, Dukes of Albany, styled themselves Lords of Man, and interwove the arms in their heraldry. In the reign of Henry IV, the kingdom of Man was conferred on the Stanleys, afterwards Earls of Derby, and latterly passed to the family of Athol by marriage. This petty sovereignty has been since purchased and annexed to the English crown. The chief places are Douglas and Castletown, and there are some considerable villages.

THANET, &c. There are also some small islands off the eastern coast, as Lindisfarn, and Coquette island, near the mouth of the river of that name, in Northumberland. The Isle of Thanet is now joined to the land of Kent; but Sheppey remains a pleasant and interesting isle.

SCOTLAND.

CHAPTER I.

NAMES.—EXTENT.—ORIGINAL POPULATION.—PROGRESSIVE GEOGRAPHY.—HISTORICAL EPOCHS.—ANTIQUITIES.

NAMES. SCOTLAND was first discovered to the Romans by Agricola; and the luminous pages of Tacitus disclosed the situation and manners of the country. It is not improbable that the Thule of the Phœnicians may have been the main land of Shetland; or, perhaps, as some think, even the north of Scotland, which the Phœnicians, standing out to sea, and afterwards bending their course towards the land, may have mistaken for another island, a circumstance not unusual in the annals of navigation. However this be, not even a hint that can be positively applied to Scotland, can be found in the ancient writers, till the Flavian family held the Roman sceptre.

Tacitus discriminates the northern part of Britain from the southern, by the special and repeated appellation of Caledonia, a name said to be derived from a Cumraig word, signifying woodlands, forests, or, perhaps, rather a mountainous country, for the ancients often blended the ideas of forest and mountain; the Riphæan mountains, for instance, being, in fact, only a vast forest, as no mountains are to be found in that situation and direction.

The names *Caledonia*, and *Caledonians*, continued to be used till the Roman power expired. Bede, the father of English history, calls the inhabitants of the country, by the name of *Picti*, which had also been used by the later Roman writers, as synonymous with that of *Caledonii*. The country he denominates, in the lax barbaric Latin of that age, *Provincia Pictorum*, the province, or region of the Picti. This new name seems to have been native (Piks, or Pehts); and to have originated from a country so styled, in the south of Norway, whence this colony had arrived. The Saxon writers, and among them king Alfred, call the people Peohts, and the country Peohtlond.

These distinctions continued till the eleventh century, when the new name of Scotia, was taken from Ireland, its former object, and applied to modern Scotland. This confusion seems to have originated from the vanity or affectation of the Irish clergy, who were established in Scotland, and were the sole instructors of the people; no native Caledonian saint being mentioned in the ecclesiastic annals, till the twefth century, the Picti retaining much of the ignorance and ferocity of their Scandinavian progenitors. Nor can the new term *Scotland*, be properly derived from any pretended conquest of the Picti, by the Attacotti, a colony of Scots or Irish, who had settled in Argyleshire, as the Saxon and Irish authors continued to use the former appellations for three centuries after that event is said to have happened.

EXTENT. That part of Great Britain, called Scotland, is about 260 miles in length, by about 160 at its greatest breadth; it extends from the 55th degree of latitude, to more than 58½. The superficial contents have been computed at 27,793 square miles, a little exceeding that of Ireland, and considerably more than half that of England. The population being estimated at 1,600,000, there will of course be only fifty-seven inhabitants for every square mile, a proportion of about one third to that of Ireland. This defect of population arises solely from the mountainous nature of the country, amounting, perhaps, to one-half, little susceptible of cultivation.

ORIGINAL POPULATION. So far as historical researches can discover, the original population of Scotland, consisted of Cimbri, from the Cimbric Chersonese. About two centuries before the Christian æra, the Cimbri seem to have been driven to the south of Scotland by the Caledonians or Picti, a Gothic colony from Norway. The Cimbri, a congenerous people with the Welch, continued to hold the country south of the two firths of Forth and Clyde; but from the former region they were soon expelled by the Picti, who, in this corner, became subject for a time to the Anglo-Saxon kings of Bernicia. On the west, the Cumraig kingdom of Strath Clyde continued till the tenth century, when it became subject to the kings of North Britain; who at the same time extended their authority, by the permission of the English monarchs, over the counties of Cumberland and Westmoreland, which abounding with hills and fortresses on the south and east, were little accessible to the English power; and while the Danes possessed the country to the north of the Humber, could yield little revenue or support to the Anglo-Saxon monarchs. From the Picti originates the population of the Lowlands of Scotland, the Lowlanders having been in all ages a distinct people from those of the western Highlands, though the Irish clergy endeavoured to render their language, which was the most smooth and cultivated of the two, the polite dialogue of the court and superior classes. About the year of Christ 258, the Dalriads of Bede, the Attacotti of the Roman writers, passed from Ireland to Argyleshire, and became the germ of the Scottish Highlanders, who speak the Irish or Celtic language, while the Lowlanders have always used the Scandinavian or Gothic.

PROGRESSIVE GEOGRAPHY. The progressive geography of Scotland, is little opulent in materials. In the second century we find

a map of North Britain, by Ptolemy; but by some singular error, it is as inaccurate as his map of Hindostan; for he represents the Mull of Galloway as the most northern promontory of Scotland, and thence bends the country due east, so that all his longitudes and latitudes are fictitious. This striking instance evidences that he often accommodated his longitudes and latitudes, from mathematical conjecture, to careless sketches which had been taken by the Roman engineers, or by navigators. But his distribution of the tribes that then inhabited Scotland, may be regarded as tolerably exact. In the centre of the country he places a vast forest, which he calls the Sylva Caledonia, chiefly extending over modern Perthshire, an indication that the colonies had settled on the shores, and that the interior part of the country was little known. The Otadeni were the people of modern Northumberland and Lothian; the Selgovæ extended over Dumfriesshire, and Kirkudbright, to the bay of Wigton, while the Novantæ filled modern Wigtonshire, and extended upwards to Ayre-bay. The fourth southern tribe was that of the Damnii, who possessed the central region, from near the source of the Clyde, to that of the Erne. On the north-east of the Damnii were the Venicontes, from the Firth of Forth to the River Dee, while the Texali held the modern shires of Aberdeen and Bamf. To the west of them were the Vacomagi, extending from Fort William to the Castra Alata or Inverness. The other tribes scarcely deserve enumeration: the Cornabii possessed the most northern parts of Scotland, from Dunsby-head to Strathnaver. Four tribes extend along the north-west, down to Loch Linny; to the south of which are placed the Epidii, in Argyleshire, who were divided by Loch Fyn from the Gadeni, who held that part to the east of Argyleshire, called Cowal, in the county of Dumbarton.

After the time of Ptolemy little information arises concerning the geography of Scotland, till, after the lapse of seven or eight centuries, we find the dawn of the present names and divisions. In the latter Roman period, the province of Valentia embraced that part which was south of the Clyde and Forth; as for a short space, from about A. D. 140 to 170, the name of Vespasiana had been imparted to the region extending from the Forth to Loch Ness. The remains of Roman roads form the chief evidence of the firm possession of the latter province.

In the middle ages, the name of Albany had been applied to that part of Scotland which lies on the north of the Firths; and about the year 1200, was written the *Descriptio Albaniæ*. In the fourteenth century, Fordun produced a larger and more precise idea of Scottish geography. Harding, who wrote his rhyming Chronicle in the reign of Edward IV, gives a tolerably exact description of Scotland, which he had visited; and some manuscripts of his work contain a rude map of the country. It must be observed, that the misapprehensions of Ptolemy concerning the due position of North Britain, are rectified, even in old Anglo-Saxon drawings. The first engraved map is that published by Bishop Lesley, with his history; but it abounds with portentous errors, which have been slowly removed. The Atlas published in the last century, does honour to the industry and abilities of Pont, and the munificence of Sir John Scott; and the recent exertions of Dorret,

Roy, Mackenzie, Huddard, Ainslie, and others, have contributed to establish some exactness in the geographical and hydrographical delineation of the country.

HISTORICAL EPOCHS. The original population of Scotland by the Cimbri, and by the Picti, forms, as usual, the first historical epoch.

2. The entrance of Agricola into Scotland, and the subsequent conflicts with the Romans, till the latter abandoned Britain.

3. The settlement of the Dalriads, or Attacotti, in Argyleshire, about the year 258, and their repulsion to Ireland about the middle of the fifth century.

4. The commencement of what may be called a regular history of Scotland, from the reign of Drust, A. D. 414.

5. The return of the Dalriads, A. D. 503, and the subsequent events of Dalriadic story.

6. The introduction of Christianity among the Caledonians, in the reign of Brudi II, A. D. 565.

7. The union of the Picti and Attacotti, under Kenneth, A. D. 843.

8. The reign of Malcom III, A. D. 1056; from which period greater civilization began to take place, and the history becomes more authentic.

9. The extinction of the ancient line of kings, in the person of Margaret of Norway, grand-daughter of Alexander III, A. D. 1290. This event occasioned the arbitrary interposition of Edward I, king of England, which was the sole source of the enmity which afterwards unhappily prevailed between the kingdoms.

10. The accession of the house of Stuart to the Scottish throne; a family which produced most ingenious and intelligent, but most unfortunate princes.

11. The establishment of the Protestant religion, A. D. 1560.

12. The union of the two crowns, by the accession of James VI. to the English sceptre, A. D. 1603.

13. The civil wars, and the subsequent disputes between the Presbyterians and Independants; causes that extinguished all sound literature in Scotland, for the space of twenty years, A. D. 1640.... 1660.

14. The revolution of 1688, and the firm establishment of the Presbyterian system.

15. The union of the two kingdoms, in 1707.

16. The abolition of the hereditary jurisdictions, 1755, which laid the first foundation of the subsequent prosperity in Scotland.

ANTIQUITIES. The monuments of antiquity belonging to the more early epochs, may be considered in the following order. Of the first epoch, no monuments can exist, except those of the tumular kind; and it is impossible to ascertain the period of their formation. The remains of the Roman period in North Britain, chiefly appear in the celebrated wall, built in the reign of Antoninus Pius, between the firths of Forth and Clyde, in the ruins of which many curious inscriptions have been found. Another striking object of this epoch, was a small edifice, vulgarly called Arthur's Oven,

which seems rightly to have been regarded by some antiquaries, as a small temple, dedicated to the God Terminus, probably after the erection of the wall of Antoninus, for we are not to conceive that these walls were the absolute lines, beyond which the Romans possessed no territory; while, on the contrary, in the pacific intervals, the garrisons along the wall may have claimed the forage of the exterior fields; and the stream of Carron, beyond which this chapel stood, may have been considered as a necessary supply of water. The remains of the wall and forts, and other Roman antiquities in Scotland, particularly their camps and stations, many of which are remarkably entire, are ably illustrated in a late publication of General Roy, to which this reference must suffice, with this sole remark, that the ingenious author has too implicitly followed a common antiquarian error, in ascribing all these camps, stations, &c. to Agricola, while they may be more justly assigned to Lollius Urbicus, A. D. 140, or to the emperor Severus, A. D. 207; especially, indeed, to the latter, for the emperor's appearance in person to conduct two campaigns, probably as far as Inverness, must have occasioned the erection of works more eminent and durable than usual, the soldiers being excited by the animating controul of a military monarch. Constantius Chlorus also, A. D. 306, made a long progress into Scotland, if we trust the Panegyrists. Nay, in the reign of Domitian, Bolanus, as we learn from Statius the poet, erected several works in Britain, probably in the north; so that it is idle to impute these remains to any one author: but to a judicious eye, the claims of Lollius Urbicus, and of Severus, seem preferable. The most northerly Roman camp yet discovered, is that near the source of the river Ythan, Aberdeenshire; periphery about two English miles. A smaller station has also been observed at Old Meldrum, a few miles to the S. E.

Roman roads have been traced a considerable way in the east of Scotland, as far as the county of Angus, affording some evidence of the existence of the province Vespasiana; but the chief remains are within the wall. A hypocaust was also discovered near Perth, and another near Musselburgh, so that there was, probably, some Roman station near the Scottish capital, but the name of Alaterva is a ridiculous error, arising from an inscription, by some foreign cohort, to obscure goddesses of their own country, styled *Matres Alatervæ*. The smaller remains of Roman antiquity found in Scotland, as coins, utensils, &c. are numerous.

With the fourth epoch may be said to commence the Pikish monuments of antiquity. The tombs it would be difficult to discriminate from those of the first epoch; but as the Caledonian kings, when converted to Christianity, held their chief residence at Inverness, the singular hill in its vicinity, presenting the form of a boat reversed, may, perhaps, be a monument of regal sepulpture. The places of judgment among the Gothic nations, or what are now styled Druidic temples, are numerous; and there is a remarkable one in the Isle of Leuis, where, probably, the monarchs resided in the most early times; but this, perhaps, rather belongs to the Norwegian settlement in the ninth century. Some of these monuments are of small circuit, and such are sometimes found at no great distance from each other, as they

were not only sometimes erected merely as temples to Odin, Thor, Freyga, and other Gothic deities; but every chief, or lord of a manor, having jurisdiction over many servants and slaves, such small courts became places of necessary awe.

The houses seem to have been entirely of wood or turf; but in some spots singular excavations are found rudely lined with stone: these are called *Weems*, and it is likely that they were always adjacent to the wooden residence of some chief, and were intended as depositories of stores, &c. the roofs being too low for comfortable places of refuge. The stations and camps of the natives, are distinguished by their round form, while those of the Romans belong to the square.

Under the next epoch it would be difficult to discover any genuine remains of the Dalriads. The houses, and even churches, were constructed in wattle-work; and the funeral monuments were cairns, or heaps of stones. It is probable that Christianity did not immediately dissolve ancient prejudices, and that even the Attacottic kings were buried in this rude manner, for the genuine chronicles do not affirm that they were conveyed to Hyona, or Icolmkill; and the sepulchres there shewn of Irish and Norwegian kings, must be equally fabulous.

To the sixth epoch may probably belong a chapel or two, still remaining in Scotland, for Bede informs us, that Nethan III, A. D. 715, obtained architects from Ceolfrid, abbot of Jarrow and Weremouth, to build a church in his dominions, probably at Abernethy; but the round tower there remaining, seems of more recent origin. About the year 830, Ungust II founded the church of St. Andrews; and the chapel called that of St. Regulus (who seems unknown in the Roman calendar), may, perhaps, claim even this antiquity. It is probable that these sacred edifices of stone were soon followed by the erection of those rude, round piles, without any cement, called Piks houses: yet they may more properly belong to

The seventh epoch, when the Danes may, if they choose, share in the honour of the erection, for such edifices have been traced in Scandinavia. They seem to have consisted of a vast hall, open to the sky in the centre, while the cavities in the wall present incommodious recesses for beds, &c. These buildings are remarkable, as displaying the first elements of the Gothic castle; and the castle of Coningsburg, in Yorkshire, forms an easy transition. The engraved obelisks, found at Forres, and in other parts of Scotland, have been ascribed to the Danish ravagers, who had not time for such erections. They are, probably, monuments of signal events, raised by the king or chiefs, and as some are found in Scandinavia, as recent as the fifteenth century, it is probable that many of the Scottish obelisks, are far more modern than is generally imagined.

To enumerate the churches and castles, erected since the reign of Malcom III, would be infinite. Some of the most splendid churches derive their foundation from David I, in the twelfth century.

CHAPTER II.

RELIGION.—ECCLESIASTICAL GEOGRAPHY.—GOVERNMENT.—LAWS.—POPULATION.—COLONIES.

RELIGION. SINCE the revolution, 1688, the Ecclesiastical government of Scotland is of the Presbyterian form; an establishment attempted in the sixteenth century, but uniformly opposed by the monarchs, as unfavourable to the royal influence. Experience has shewn that the prejudice was unfounded; but violent commotions happened before the Presbyterian triumph became firm. The number of parishes in Scotland is 941*; contiguous parishes unite in what is called a Presbytery, of which denomination there are sixty-nine. The provincial synods amounting to fifteen, are composed of several adjacent presbyteries: but the grand ecclesiastical court is the General Assembly, which meets every year, in the spring, the king appointing a commissioner to represent his person, while the members nominate their moderator or president. To this ecclesiastic council laymen are also admitted, under the name of Ruling Elders, and constitute about one third of this venerable body. This court discusses and judges all clerical affairs, and admits of no appeal, except to the parliament of Great Britain. In general the Scottish clergy deserve the highest praise, as men of enlightened minds, and moderate conduct; and a singular proof of the diffusion of talents among them, has recently appeared in the Statistical Account of Scotland, published by Sir John Sinclair, in twenty-one volumes; for there are few parishes of which the account is not ably delineated by the clergyman himself; a phœnomenon in the literary world, which will hardly be rivalled by nine hundred philosophers, or rather theorists of the modern school.

As whatever establishment is effected in a free country, opposition will always arise, the establishment of the Presbyterian system, was, in the space of one generation, followed by the secession. In 1732, about forty ministers presented an address to the general assembly, specifying several defections, which, in their opinion, had taken place, from the original constitution of the church, which, in truth, had too much of the rigour of Calvin. Some of the seceders were deprived of their living by a committee of the general assembly. Persecution, as usual, produced followers, and the seceders soon formed a numerous party. About the year 1747, they were themselves divided into two denominations, called the Burghers and the Anti-burghers, because the division arose concerning the legality of the oaths taken by the

* Statist. Account.

burgesses of some of the royal boroughs; the former allowing that the oath is proper, while the latter object; the former are the more numerous, the number of their ministers being computed at about one hundred, and at a medium each has a congregation of about one thousand.

Many respectable families in Scotland, embrace the episcopal form of the church of England. The other descriptions of religious professions, are not numerous. There are but few Roman Catholics, even in the remote highlands, the scheme of education being excellent, and generally supported with liberality.

Ecclesiastic Geography. To enumerate the Ecclesiastical Geography of Scotland, would be to enumerate its parishes; nor are the presbyteries and synods of such account as to influence the fate of the towns where they assemble. The ancient establishment comprised two archbishoprics, those of St. Andrews and Glasgow; and eleven bishoprics (that of Edinburgh having only been established by Charles I), which, in the order of antiquity, may be thus enumerated; Galloway (St. Andrews), Dunkeld, Moray: five founded by David I, Brechin, Dumblane, Aberdeen, Ross (Glasgow); that of Argyle, or Lismore, was founded about the year 1200, because the bishops of Dunkeld did not speak the Irish tongue. The bishops of Orkney, and of the Western Islands, date from an early period, while their sees were not subject to the Scottish crown.

Government. The Government of Scotland, since the union, has been blended with that of England. The chief distinction between the original constitution of the two countries, was, that Scotland had no house of commons, the parliament, consisting of all descriptions, assembled in one hall. That enlightened prince, James I, of Scotland, endeavoured to establish a house of commons, in imitation of that of England, where he was educated; but the people most firmly and vigorously defended their slavery. The most splendid remaining feature of the government in Scotland, is the General Assembly. Next to which may be classed the high courts of justice, especially that styled the Session, consisting of a president, and fourteen senators. The Lords of Session, as they are styled in Scotland, upon their promotion to office, assume a title, generally from the name of an estate, by which they are known and addressed, as if peers by creation, while they are only constituted lords by superior interest or talents. This court is the last resort in several causes, and the only appeal is to the parliament of Great Britain. It is to be regretted, that the causes are not determined by jury as in England. The justiciary court consists of five judges, who are likewise lords of session, but with a president styled the Lord Justice Clerk, as he is only understood to represent the formerly great office of Justice General. This is the supreme court in criminal causes, which are determined by the majority of a jury, and not by the unanimity, as in England. There is also a court of Exchequer, consisting of a Lord Chief Baron, and four Barons; and a High Court of Admiralty, in which there is only one judge. The keepers of the great and privy seals, and the lord register, or keeper of the records, may also be mentioned under this head.

LAWS. The law of Scotland differs essentially from that of England, being founded, in a great measure, upon the civil law. It partly consists of statute law; but many of the ancient statutes never having been enforced, the chief rule of this sort arises from the decisions of the session, which are carefully preserved and published, and afford precedents, generally deemed unexceptionable. Of common law there is hardly a trace, while the civil and canon laws, may be said to form the two pillars of Scottish judicature. The modes of procedure have, however, the advantage of being free from many of those legal fictions, which disgrace the laws of some other countries. It may, indeed, be deemed a fiction, that a debtor, who refuses or neglects to pay, should be proclaimed a rebel to the king, and as it is called, *put to the horn*, before he can be imprisoned. The inferior courts are those of the sheriffs, magistrates, and justices of the peace. Under the hereditary jurisdictions, happily abolished, the peers, and other great men, maintained a power, almost absolute, over their tenants and followers, so that there was no law but the will of the master, and the cities alone could be deemed seats of freedom.

POPULATION. The most exact account of the population of Scotland, is that given in the Statistical Account*, from which it appears that the amount, in 1798, was 1,526,492; while, in 1755, it was only 1,265,380; the increase, therefore, is 261,112. The most populous counties are, in the order of numbers, Perth, 133,274; Lanark, 125,254; Aberdeen, 122,921; Mid-Lothian, 122,655; Forfar, 91,001; Fife, 87,250; Argyle, 76,101.

COLONIES. There are no Scottish colonies distinct from those of England; that of Darien, attempted in the reign of William III, was unsuccessful. Nor is this to be regretted, as it is now perfectly understood that the climate is unhealthy, and unfit for any settlement, so that the Spaniards themselves have neglected it.

The army, navy, revenues, political importance and relations of Scotland, are now inseparably intermingled with those of England.

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CHAPTER III.

MANNERS AND CUSTOMS.—LANGUAGE.—LITERATURE.—EDUCATION.—UNIVERSITIES.—CITIES AND TOWNS.—EDIFICES.—INLAND NAVIGATION—MANUFACTURES AND COMMERCE.

MANNERS AND CUSTOMS. THE Manners and Customs of the Scots, begin to be much assimilated with those of the English. In their religious ceremonies, attending baptism and marriage, there are variations, arising from the Presbyterian form, which does not admit of godfathers or godmothers, but renders the parents alone answerable for the education of the child. The clergyman does not attend at funerals, nor is there any religious service; but generally great decency. The hearse seems a more appropriated machine than the close waggon so called in England, being a light and lofty carriage, of trellice work, painted with black, and spotted with the resemblance of falling tears, an idea derived from the ancient French ceremonies, as may be observed in the collection by Montfaucon. Among the lower classes, the funerals are generally far more numerously attended than in England; nor is black an indispensable colour of dress on such occasions.

In the luxuries of the table, the superior classes rival the English, and the gentlemen are, perhaps, rather more fond of wine. The abundance and beauty of the table-linen are deservedly praised by strangers: several national dishes, formerly served up at the best tables, and originating from the French cooking, in the reign of Mary, are now common or neglected, such as the haggis or *hachis;* cock-a-leekie, or a capon boiled down with leeks; crapped heads, or haddocks stewed, the heads being stuffed with a kind of forced-meat balls, &c. &c. The diet of the lower classes passes in a gradual transition from the north of England. The chief food is *fiarich*, or thick pottage, formed with oatmeal and water, and eaten with milk, ale, or butter; in a hard lumpy form it is called *brose*. With this the labourer is generally contented twice or thrice in the day, with a little bit of meat for Sunday; nor does he repine at the bacon of the English poor, as it is a food which he commonly loathes, there being an ancient antipathy to swine, as impure animals, into which the demons passed, as mentioned in the New Testament. A similar antipathy prevails against eels, as they resemble a serpent, and the old serpent. The lower classes of Scotland were little given to ebriety, till a succession of improvident laws and regulations, reduced the wholesome malt liquors to mere water, when they were driven to the destructive beverage of whisky; but in general their sobriety is exemplary; and the Scottish manufacturer or labourer, instead of wasting his weekly gains at an alehouse, is ambitious to appear with

his family in decent clothes, on Sundays and other holidays. This may be regarded as a striking characteristic of the Scottish peasantry, who always prefer the lasting decencies of life, to momentary gratifications. To this praise of sobriety, may be added that of intelligence, arising from the diffusion of education, which is such, that even the miners in the south possess a circulating library.

The houses of the opulent have been long erected upon the English plan, which can hardly be exceeded for interior elegance and convenience. Even the habitations of the poor have been greatly improved within these few years, and instead of the mud hovel, with straw, there often appears the neat cottage of stone, covered with tile or slate. Whence the ancient custom arose, of placing the dunghill in the front of the house, cannot well be imagined; perhaps it was intended in defence, and if so, is useless in pacific times; perhaps it is meant as a display of opulence, in which case it is hoped that good sense will extinguish such superfluous vanity.

The dress of the superior classes, is the same with that of the English, and only waits the arrival of the fashions from London, which are conveyed by the mail-coaches with great speed. The gentlemen in the Highlands, especially in time of war, use the peculiar dress of that country. Among the other classes, the Scottish bonnet is now rarely perceived, except in the Highlands; it was the usual covering for the head all over Europe, till towards the end of the sixteenth century, when the hat, formerly only worn in riding or hunting, came into general use. The Scottish peasantry are now generally clothed in good broad-cloth, worsted stockings, and strong shoes, instead of the home-spun habiliment and nudity of the lower extremities. This last singularity, common in Wales, and even in England about two centuries ago, is mostly abandoned even by the Scottish lasses, who may now aspire to the Order of the Garter. In the Highlands, it is to be regretted, that a distinction of dress still prevails, as any variation in dress or language only fosters prejudices, and proves the most fatal impediment to the progress of civilization. Even in these enlightened times, if any nation were to return to the state of nudity, a philosopher could hardly avoid the idea, that they were savages; and the mass of mankind would certainly consider them as such, for trifles often lead to the most serious evils.

The amusements of the rich are on a parallel with those of the English; but those of the peasantry have several diversities, which the reader may, perhaps, best learn from the poems of Burns. That of *curling* consists in rolling large stones, with iron handles, upon the ice, towards a fixed mark, a favourite and healthy diversion in the winter. The English quoits are supplied by *penny-stanes*, round flat stones, which are tossed in the same manner. Two exquisite poems of Mr. Burns, his *Halloween* and his *Cotter's Saturday Night*, will convey more information concerning the amusements, superstitions, and manners, of the Scottish peasantry, than the most long and animated detail.

LANGUAGE. The Scottish language falls under two divisions, that of the Lowlands consisting of the ancient Scandinavian dialect, blended with the Anglo-Saxon; and that of the Highlands, which is

Irish. A strict examination of the former, by an unprejudiced inquirer, would evince that it does not originate solely from the Anglo-Saxon, as some conceive, the mode of spelling and pronouncing numerous words, being unknown to the southern idiom: Of this, among other instances, may be mentioned the *qu* of the Caledonians, an old Gothic combination, for which Ulphilas invented a letter, and for which the Anglo-Saxons used the *w;* as *quhat* for *what*, &c. But this is not the place for such discussions; and it will be sufficient to produce the usual specimen, which, in the most ancient language of the Lowlands, would be as follows:

Uor fader quhilk beest i Hevin. 2. Hallowit weird thyne nam. 3. Cum thyne kingrik. 4. Be dune thyne wull as is i hevin sva po yerd. 5. Uor dailie breid gif us thilk day. 6. And forleit us uor skaths, as we forleit tham quha skath us. 7. And leed us na intil temtation. 8. Butan fra us fra evil. Amen.

The islands of Orkney were seized by the Norwegians, in the ninth century, and the inhabitants retained the Norse language, till recent times, when they began to speak remarkably pure English. Chamberlayne has given the Lord's Prayer in their ancient dialect:

Favor ir i chimre. 2. Helleur ir i nam thite. 3. Gilla cosdum thite cumma. 4. Veya thine mota vara gortio yurn sinna gort i chimrie. 5. Ga vus da on da dalight brow vora. 6. Firgive vus sinna vora sin vee firgive sindara mutha vus. 7. Lyve us ye i tuntation. 8. Min delivera vus fro olt ilt. Amen; *or*, On sa meteth vera.

In the Erse, or Irish, of the Highlands, the same supplication runs thus:

A n'Athair ata air Neamh. 1. Gu naamhaichear t Tinm. 2. Tigeadh do Rioghachd. 3. Deanthar do Thoil air an Talamh mar a nithear air Neamh. 4. Tabhair dhuinn an diu ar n Aran laitheil. 5. Agus maith dhuinn ar Fiacha amhuil mar mhaithmid d'ar luehd...fia chaibh. 6. Agus na leig am buaireadh sinn. 7. Ach saor sinn o Ole. Amen.

LITERATURE. The Literature of Scotland recompences for its recent origin, by its rapid progress, and extensive fame. The country that produced Buchanan, in the sixteenth century, could not, in the twelfth, boast of one native writer; and only national vanity, or affected ignorance, would claim authors which really belong to other countries. In the thirteenth century, the native literature first begins to dawn; when Scotland, filled with a barbarous Scandinavian colony, must not in this respect be compared with the southern countries of Ireland and England, but with Scandinavia itself, with Holland, and the north of Germany, Poland, Prussia, Russia, and Hungary; in all which countries Christianity and literature are comparatively recent.

Yet, it must not be forgotten, that in the sacred ground of Hyona, flourished several respectable Irish writers, who are also classed among the apostles of religion and learning in England; such were Columba, who converted the northern Caledonians, and his biographers, Cumi-

nius and Adomnan, the latter the friend of Bede. Among the Strathclyde Welch, may be named Patrick, in his turn the Apostle of Ireland.

Independently of these, the most ancient fragment remaining of Scottish literature, is the *Chronicon Pictorum*, written by some Irish clergyman, probably a dignitary of the church of Abernethy, in the beginning of the eleventh century. Of the twelfth century there are some fragments, in the Register of St. Andrews; and some short Chronicles published by Innes: the Chronicle of Melrose, and that of Holyrood.

One of the earliest native writers, is Thomas of Erceldon, called the Rimer, who flourished about the year 1270, and wrote a metrical romance, called Sir Tristram, now unfortunately lost. The next author of note is John Barbour, Archdeacon of Aberdeen, who wrote his poem on the actions of Robert I, in the year 1375, no mean monument of industry and talents for that period. At the same time flourished John Fordun, the father of Scottish history. James I, of Scotland, wrote some excellent poems, early in the fifteenth century; and he was followed by Holland, and Henry the Rimer. In the end of that century arose Dunbar, the chief of the ancient Scotish poets; and, in the beginning of the next, Gawin Douglas, and David Lindsay. The Scottish muse continued to warble till the middle of the seventeenth century, when religious fanaticism extinguished all the arts and sciences, but not before Drummond had woven his web of Doric delicacy. In more modern times, the names of Thomson, Blair, Armstrong, Beattie, Burns, &c. are universally known.

Rude chroniclers continued the chain of events; but History was mute till Buchanan sounded his classical trumpet. Bishops Lesley and Burnet are not without their merit; but why repeat to the echoes of fame, the illustrious names of Hume and Robertson?

The other departments of science are of yet more recent cultivation in Scotland; even theology seems unknown till the beginning of the sixteenth century; and of medicine there is no trace till the seventeenth: while we can now boast of Blair; and Edinburgh ranks among the first medical schools of Europe. Natural philosophy and history were totally neglected till after the Restoration, yet Scotland can now produce able writers in almost every branch, and equal progress has been made in moral philosophy. Among the few departments of literature, in which the Scottish authors have been unsuccessful, may be named epic poetry, comedy, and the critical illustration of the classics.

Education. The mode of education pursued in Scotland is highly laudable; and is, perhaps, the best practical system pursued in any country in Europe. The plan which is followed in the cities, is nearly similar to that of England, either by private teachers, or at large public schools, of which that of Edinburgh is the most eminent, and may be traced from the sixteenth century. But the superior advantage of the Scottish education consists in every country parish, possessing a schoolmaster, as uniformly as a clergyman: at least, the rule is general, and the exceptions rare. The schoolmaster has a small salary, or rather pittance, which enables him to educate the children, at a rate

easy and convenient, even to indigent parents. It may, indeed, be computed, that a shilling will go as far in this parochial education, as a guinea in an English school. In the Highlands, the poor children will attend to the flocks in the summer, and to the school in the winter. It is to be wished that the salary of that most useful body of men, the parochial schoolmasters, were moderately augmented, so as not to elevate them above their duty, but to secure them from want, or from the necessity of intermingling other labour with their important and salutary office.

UNIVERSITIES. The universities of Scotland, or rather colleges (for an English university includes many colleges and foundations), amount to no less than four; three on the eastern coast, St. Andrew's, Aberdeen, and Edinburgh; and one on the western, that of Glasgow. It would have been far preferable to have founded one on the western coast of Rosshire, in the centre of the Highlands and Isles, that the light of science might have been diffused over these neglected regions.

The university of St. Andrew's was founded by Bishop Wardlow, in the year 1412; but as it is now of small importance in the proximity of that of Edinburgh, it would be a patriotic measure to transfer it to the Highlands as above mentioned. That of Glasgow was founded by Bishop Turnbull, in the year 1453, and it has produced many illustrious professors and able students. The late Mr. Anderson, professor of natural philosophy, founded an institution to promote the knowledge of natural philosophy and history; and more especially the application of these sciences, to the useful purposes of commerce and manufactures*. It is, indeed to be wished, that practical utility, and the business of real life, were the chief intentions of a collegiate education.

The third university, that of Aberdeen, was founded by Bishop Elphinstone, in the year 1500, and it has always supported its high character and intentions. In the year 1593, George Keith, fifth Earl Marshal, founded a college at Aberdeen, being the only Scottish nobleman who can claim that high honour. The last, not least, is that of Edinburgh, founded by James VI, in 1580; and the bare enumeration of its illustrious professors and writers, would occupy too much space for the present plan. The buildings being mean and confined, the foundation of a new edifice was laid in 1789, and, it is hoped, will soon be completed on the magnificent plans adjusted by Mr. Adams.

CITIES AND TOWNS. The chief cities and towns in Scotland, must now be considered.

EDINBURGH. Edinburgh, the capital, is comparatively of modern name and note. Maitland, and other antiquaries, have fallen into miserable mistakes and misquotations, concerning the origin of this city: a passage of an old writer has been adduced for its existence in 854, while the original is completely silent. Whatever may be the epoch of its existence, the earliest hint that can be applied to it, occurs in the *Chronicon Pictorum*, about the year 955, where mention is made of a town called Eden, as resigned by the English to the Scots,

* Garnet's Tour, ii. 193.

then ruled by Indulf. In the next century, Malcolm III, and Margaret of England, his celebrated queen, are said to have resided in the castle; but her life by Turgot, omits this circumstance, and Holyrood house was the foundation of the first David. But Scottish antiquities have been treated with such inaccuracy, that crude notions are perpetually substituted, instead of that exact knowledge which is to be found in those of other countries.

The population of Edinburgh, including the port of Leith, was, in 1678, computed at 35,500; in 1755, at 70,430; and in 1791, at 84,886*. It is probable the present population falls little short of 90,000. The arrivals and clearances at Leith harbour, exceed the number of 1700 vessels of various descriptions, ships, brigs, and sloops. Of these 165 belong to the town: the commerce has been stated at half a million annually.

The houses in the old town of Edinburgh, are sometimes of remarkable height, not less than thirteen or fourteen floors, a singularity ascribed to the wish of the ancient inhabitants, of being under the protection of the castle. This part of the city stands on the ridge of a hill, gradually descending from the lofty precipice on which the castle is situated, to a bottom, on which stands the palace of Holyrood-house. Adjacent to this edifice, is a park of considerable extent, replete with mountainous scenery, for the basaltic heights of Arthur's seat, and Salisbury crags, are within its precincts. The new town of Edinburgh is deservedly celebrated for regularity and elegance, the houses being all of free-stone, and some of them ornamented with pillars and pilasters. Brick, is, indeed, almost unknown in Scotland; and is apt to impress the Scottish traveller with the ideas of slightness, and want of duration. There are several public edifices in Edinburgh, which would do honour to any capital; among such may be named the castle, the palace, the principal church, Heriot's hospital, the register-office, the new college, and several other buildings in the new city†. There is an elegant bridge, reaching from the hill on which the ancient city stands, to the elevated site of the new town. Another bridge passes in a line with the former, towards the south, over a street called the Cowgate: and an artificial mound extends from the western part of the ridge, to the opposite hill. The environs of Edinburgh are singularly pleasing and picturesque. On the north is an elevated path, leading to the harbour of Leith: on the east are Mussleborough and Dalkeith, rural villages, watered by a beautiful stream. On the south, Pentland-hills; and towards the west, the rivulet Leith, with banks of romantic variety.

Glasgow. The second city in Scotland is Glasgow, of ancient note, and ecclesiastical story, but of small account in the annals of commerce, till the time of Cromwell's usurpation‡. The population of Glasgow, in 1755, was computed at 23,546, including the suburbs: the number, in 1791, was estimated 61,945. The ancient city was rather venerable than beautiful, but recent improvements have rendered it one of the neatest cities in the empire. Its western

* Statist. Account, vi. 564. † Arnot's Edinburgh. Kincaid's Do.

‡ Denholme's Glasgow.

situation exposes it to frequent rains, a disadvantage recompenced by its favourable position for commerce with America and the West Indies. Its commerce has arisen to great extent since the year 1718, when the first ship that belonged to Glasgow crossed the Atlantic*. The number of ships belonging to the Clyde, in 1790, was 476, the tonnage 46,581; but, before the American war, it was supposed to have exceeded 60,000 tons. Though the manufactures scarcely exceed half a century in antiquity, they are now numerous and important†. That of cotton, in 1791, was computed to employ 15,000 looms; and the goods produced, were supposed to amount to the yearly value of 1,500,000*l.* the manufactures of linens, woolens, &c. are far from being of similar consequence. The ancient cathedral of Glasgow survived the reformation, when the other Scottish edifices of that denomination sunk into ruins. Two convenient bridges are thrown over the Clyde. The environs of Glasgow present nothing remarkable.

PERTH. Next in eminence are the cities of Perth and Aberdeen, and the town of Dundee. Perth is an ancient town, supposed to have been the Victoria of the Romans, but the fables concerning Bertha are beneath notice‡. It is pleasantly situated on the western bank of the river Tay: and has been known in commerce since the thirteenth century, but at present the trade is chiefly of the coasting kind, Dundee possessing a more advantageous situation for foreign intercourse. Linen forms the staple manufacture, to the annual amount of about 160,000*l.* There are also manufactures of leather and paper. Perth displays few public edifices worth notice. Inhabitants about 28,000. There is a noble bridge of recent date, over the Tay, and the environs are interesting, particularly the hill of Kinnoul, which presents singular scenes, and many curious mineral productions||.

DUNDEE. About eighteen miles nearer the mouth of the Tay, stands Dundee, in the county of Angus, a neat modern town. The frith of Tay is here between two and three miles broad; and there is a good road for shipping to the east of the town, as far as Broughty-castle. On the 1st. of September, 1651, Dundee was taken by storm by General Monk; and Lumisden, the governor perished amidst a torrent of bloodshed. The population is, however, now computed at 24,000; the public edifices are neat and commodious. In 1792, the vessels belonging to the port, amounted to 116, tonnage 8550. The staple manufacture is linen, to the annual value of about 80,000*l.* canvass, &c. about 40,000*l.* Coloured thread also forms a considerable article, computed at 33,000*l.* and the leather tanned at 14,000*l.***.

ABERDEEN. Aberdeen first rises to notice in the eleventh century, and continued to be chiefly memorable in ecclesiastic story. In the fourteenth century it was destroyed by Edward III, of England. The population in 1795, was computed 24,493. Though the harbour be not remarkably commodious, it can boast a considerable trade, the chief exports being salmon and woolen goods. In 1795, the British ships entered at the port, were sixty-one, the foreign five; and the

* Statist. Account, v. 498. † Ibid. 502. ‡ Ibid. xviii. 489, &c.
|| Anderson's Muses, Threnodia. ** Statist Account, viii. p. 204, &c.

British ships cleared outwards, amounted to twenty-eight. The chief manufactures are woollen goods, particularly stockings, the annual export of which is computed at 123,000*l*. The coarse linen manufactures are not of much account; but the thread is of esteemed quality.

The other chief towns of Scotland shall only be briefly mentioned, beginning with the south-east part of the kingdom.

BERWICK. Berwick is a fortified town of some note, and carries on a considerable trade in salmon. The vessels built at this port, are constructed on excellent principles.

JEDBURGH. Jedburgh, on the river Jed, which descends from the Cheviot-hills, is chiefly remarkable for the beautiful ruins of an abbey, founded by David I. In the year 1523, it was burnt by the Earl of Surrey, who says that it then contained twice as many houses as Berwick, many of them elegantly built; and it was defended by six strong towers.

DUMFRIES. Dumfries stands upon a rising ground, on the eastern banks of the Nith, and contains about 6000 inhabitants.

AYR. Ayr, the chief town in the S. W. of Scotland, is situated on a sandy plain, on a river of the same name. The chief trade is in grain and coals: and a few vessels are built. Inhabitants about 7000. Irwin has about 4000.

LANARK. Lanark stands in a most picturesque country, near the celebrated falls of the Clyde. It was only noted for its academy, under the management of Mr. Thomson, brother-in-law of Thomson the poet, till the recent cotton manufacture, and other erections by the patriotic Mr. Dale, rendered this town still more worthy of attention.

GREENOCK. Greenock and Port Glasgow, are considerable towns, which have arisen to celebrity, by sharing in the trade of Glasgow. Greenock is supposed to contain 15,000 inhabitants; Port Glasgow about 4000. Paisley, in the same county, is celebrated by its manufactures of muslin, lawns, and gauzes, to the annual amount, it is said, of 660,000*l*. The population amounts to about 20,000. Dumbarton, on the opposite shore of the Clyde, contains above 2000 souls, and is also subservient in the manufactures of Glasgow.

STIRLING. Stirling is rather remarkable for its commanding, and truly royal situation, than for its industry. The inhabitants are computed at 5000. Between Stirling and Edinburgh stands Boness, formerly called Borrowstowness, in the midst of collieries and salt-works: the harbour is good, and there are about 2600 inhabitants.

The county of Fife contains many towns, some of which were in a more flourishing situation, when Scotland carried on a considerable intercourse with France.

DUNFERMLINE. Dunfermline is a pleasant town, containing about 5000 inhabitants, and carries on a considerable manufacture of diapers. There are ruins of a palace, the royal residence in the time of Malcolm III. St. Andrew's has about 2,500; it is chiefly remarkable for its ruined cathedral.

Forfar, in Angus, contains about 3400 souls: the linen manufactures deserve mention.

DUNKELD. Dunkeld is of venerable and picturesque fame, but its linen manufactures are inconsiderable. Brechin contains about 5000 people: its products are linen, cotton, and tanned leather. Montrose has an equal population, and a few manufactures; the buildings are mostly modern and neat.

The county of Mearns presents no town worth mention. Peterhead, in Aberdeenshire, contains about 2000 souls. It has a mineral spring, and carries on some trade with the Baltic. Frazerburgh, near the promontory of Kinnaird Head, has also a tolerable harbour.

PORTSOY. Portsoy is a sea-port town, peopled with about 2000 souls. In the neighbourhood, are the rocks well known to mineralogists, containing elegant granites, of different kinds, serpentines, and steatites, with their usual concomitants, asbestos and amianthus.

ELGIN. Elgin, the capital of the county of Moray, boasts of the remains of an elegant cathedral, and is supposed to contain 4000 inhabitants.

INVERNESS. Inverness is an ancient and flourishing town, the capital of the northern Highlands. The population is computed at 10,000. The chief manufactures are ropes and candles. An academy has lately been founded here on an excellent plan.

The few towns further to the north are of little account. Port Rose has only 800 souls; but Cromarty has about 3000, a small manufacture of coarse cloth, and some coasting trade in corn, thread, yarn, nails, fish, and skins. Dingwall contains 700 souls, and a small linen manufacture. Tain has about 1000 inhabitants. Dornoch was once the residence of the bishops of Caithness: population only 500. After a dreary interval Wick occurs, the last town on the eastern coast; the inhabitants, about 1000, chiefly deal in cod and herrings.

Thurso, on the northern shore, fronting the Orkneys, has manufactures of woolen and linen. Population about 1600.

INVERARY. Hence there is a lamentable void along the western half of Scotland, till we arrive at Inverary, in Argyleshire, the foundation of the noble house of Argyle, after passing a space of about 160 miles, where only a few scattered hamlets can be found. Inverary is a neat and pleasant town, of about 1000 souls; there are manufactures of linen and woolen, and a considerable iron-work. The ore is brought from the west of England, and is smelted with charcoal from the woods of Argyleshire.

CAMPBELTOWN. In the same county is Campbeltown, a royal borough, in the southern part of the peninsula of Cantire. The trade is considerable, as it is the general resort of the fishing vessels; and the inhabitants are computed at 5000. The harbour is excellent, in the form of a crescent, opening to the east, in front of the island of Arran. About fifty weavers are employed in the cotton manufacture*.

EDIFICES. Scotland abounds with remarkable edifices, ancient and modern. Those of the capital have been already mentioned. In its vicinity is Hopeton-house, the splendid residence of the earl of

* Statist. Account, x. 552.

Hopeton; Dalkeith palace, a seat of the duke of Buccleugh; Newbottel, the seat of the Marquis of Lothian; Melville castle, the elegant villa of the Right Hon. Henry Dundas; and the splendid residence of the Marquis of Abercorn. Nor must Pennicuik, the seat of the family of Clerk, be omitted; but the traveller of taste would be more interested in Hawthornden, the ancient seat of Drummond the poet. It would be vain to attempt a similar enumeration for the other counties, and only a few of the most remarkable shall be mentioned; such as in the south, the Duke of Roxburgh's, near Kelso; Mount Teviot, a seat of the Marquis of Lothian; Minto Tower, Lord Minto's; Lauder castle, Marchmont, near Polwarth, both in the Merse; the Duke of Queensberry's at Drumlanrig; Lord Douglas's villa at Bothwell; and Hamilton palace, near Hamilton. The county of Ayr contains many beautiful edifices belonging to the nobility and gentry, among which may be mentioned Loudon house, the seat of the Earls of Loudon; Dundonald, that of the Cochrans, Earls of Dundonald, and Colaine castle, the seat of the Earl of Cassils, designed by Adams, in 1789. Wigtonshire has Culhorn, the seat of the Earls of Stair, and Castle Kennedy; Galloway house, Merton, &c. In the vicinity of the flourishing city of Glasgow, it may be imagined that the villas must be numerous and elegant; and, even the small island of Bute can boast of Mount Stuart. The castle of Dumbarton is another remarkable edifice in this region.

On passing the Forth, the rich county of Fife presents many interesting edifices, such as Leslie castle, the seat of the Earls of Rothes; Wemyss, Kelly, and Balcarras, the seat of the earls of those titles; the house of Kinross, built by Sir William Bruce, &c. &c. Perthshire contains Tullibardin and Blair, the seats of the Duke of Athol; Dupplin, that of the earl of Kinnoul; Drummond, the residence of Lord Perth; Taymouth, the splendid mansion of the Earl of Braidalban; Scone a royal palace, &c. &c. In Angus we find Panmure, the ancient residence of the Earls of Panmure; Athie, that of the Earls of Northesk; and Kinnaird, of the Earls of Southesk; Glammis, the venerable seat of the Earls of Strathmore. The shire of Mearns, or Kincardine, contains Dunotter castle, the elevated mansion of the Earls Marshal, &c. Aberdeenshire presents Castle Forbes, Philorth, and Haddo: in Bamfshire we find Cullen house, the interesting seat of the Earl of Finlater; Duff house, that of the Earl of Fife; Gordon castle, a beautiful mansion of the Duke of Gordon; in the county of Moray, Tarnaway castle, the seat of the Earl of Moray; Inverness presents Fort George, a military erection of some note, about twelve miles to the east of Inverness. The line of forts is continued through the centre of the county, by Fort Augustus, at the further end of Loch Ness, and Fort William, at the northern extremity of Loch Linny, at the bottom of the lofty Bennevis. In the county of Ross, on the north of Dingwall, is Castle Leod, a seat of the Earls of Cromarty: New Tarbet, and Balnagowan, command the Firth of Cromarty. At Dornock and Dunrobin, are seats of the Earls of Sutherland. The shore of Caithness displays many ancient castles, but the modern edifices are few: the patriotic Sir John Sinclair, has a pleasing residence near Thurso; and in the N. W. extremity of Scotland, Lord

Reay has two mansions, one near Tong, and another at Durness, with an extensive wild of rocks, interspersed with morasses, called Lord Reay's forest. The western coasts of Scotland present an enormous void, till Inverary, the splendid mansion of the Dukes of Argyle, rises like some oriental vision in the wilderness.

INLAND NAVIGATION. The most remarkable inland navigation in Scotland, is the excellent and extensive canal from the Forth to the Clyde. Mr. Smeaton's first survey was presented in 1764; but four years elapsed before the act of parliament was passed for its execution, and the canal was begun in the same year with the act*.

"The dimensions of this canal, though greatly contracted from the original design, are much superior to any work of the same nature in South Britain†. The English canals are generally from three to five feet deep, and from twenty feet to forty wide, and the lock gates from ten to twelve feet; but they answer the purpose of inland carriage from one town to another, for which alone they were designed. The depth of the canal between the Forth and Clyde, is seven feet; its breadth at the surface fifty-six feet; the locks are seventy-five feet long, and their gates twenty feet wide. It is raised from the Carron by twenty locks, in a tract of ten miles, to the amazing height of 155 feet above the medium of full sea-mark. At the twentieth lock begins the canal of partition on the summit, between the east and west seas; which canal of partition continues eighteen miles, on a level, terminating at Hamilton-hill, a mile N. W. of the Clyde, at Glasgow. In some places the canal is carried through mossy ground, and in others through solid rock. In the fourth mile of the canal there are ten locks, and a fine aqueduct bridge, which crosses the great road leading from Edinburgh to Glasgow. The expense of this mile amounted to 18000*l.* At Kirkintulloch, the canal is carried over the water of Logie, on an aqueduct bridge, the arch of which is ninety feet broad, and was built at three different operations, of thirty feet each, having only one centre of thirty feet broad, which was shifted on small rollers, from one stretch to another. Though this was a new thing, and never attempted before with an arch of this size, yet the joinings are as fairly equal as any other part of the arch. The whole is thought to be a capital piece of masonry. There are in the whole eighteen draw bridges, and fifteen aqueduct bridges, of considerable size, besides small ones and tunnels."

The supplying the canal with water, was of itself a very great work. One reservoir is above twenty-four feet deep, and covers a surface of fifty acres, near Kilsyth. Another about seven miles north of Glasgow, consists of seventy acres, and is banked up the sluice, twenty-two feet.

The distance between the firths of Clyde and Forth, by the nearest passage, that of the Pentland Frith, is 600 miles, by this canal scarcely 100. On the 28th of July, 1790, the canal was completely open from sea to sea, when a hogshead of the water of Forth was poured in the Clyde, as a symbol of their junction. The length of the canal is precisely thirty-five miles, and no work of the kind can be more ably finished.

* Philips, 276. † Ibid. 316.

Another laudable plan was to conduct a canal from Fort William to Inverness, than which nothing could contribute more to improve the Highlands. The space to be cut would not be considerable, but the times are unfavourable to such a design. The canal at Crinan, which will save a troublesome navigation around Cantire, is actually begun, and it is hoped will speedily be completed, when vessels could pass at once from the Clyde to the north of Jura. Could a canal be opened from the Firth of Dornoch, and Loch Shin, into the bay of Calval, in Assynt, perhaps every thing of this kind would be accomplished, that can be executed in the Highlands.

MANUFACTURES AND COMMERCE. The general commerce of Scotland, though on a smaller scale, and with smaller capitals, is in most respects similar to that of England, and shares in the national prosperity. That of the capital, through Leith, its port, has been estimated, as we have seen, at half a million yearly*. The chief exports are linen, grain, iron, glass, lead, woolen stuffs, soap, &c. &c. The imports are wines, brandy; and from the West Indies and America, rum, sugar, rice, indigo. Glasgow exports cottons of all kinds, muslins, lawns, gauzes, &c. glass, stockings, earthen-ware, cordage, &c. candles, soap, iron, leather, &c. &c. The chief imports are tobacco, sugar, rum, and cotton from the West Indies; Irish beef, butter, and linen; wines from Portugal, and other countries. The fisheries of Scotland, if carried to a proper extent, would furnish a very considerable store of merchandize.

The chief manufactures of Scotland are linen of various kinds, to the amount, it is said, of about 750,000*l* annually. Of woolens, the Scottish carpets seem to form the chief branch. The iron manufactures, particularly that at Carron, deserve also to be enumerated among the chief national advantages.

As the necessary progress of manufactures and commerce, is from the south to the north, owing, among other causes, to this, that the prices of food and labour are smaller in the north than in the south, it is to be expected, and indeed wished, for the general benefit of the British empire, that the trade which has passed from Bristol to Liverpool and Glasgow, may gradually enliven and invigorate, even the Western Highlands and Islands of Scotland. Some few of the gentlemen in the Highlands, seem to object to the propagation of industry, as tending to deprive them of their ancient respect, and the reminiscence of feudal power; but this infatuation cannot continue, as it must soon be perceived, that to diffuse a spirit of industry among their tenants, is the only infallible mode of increasing their own revenues.

* In 1793, the Scottish exports were computed at 1,024,742*l*. Chalmers's Estimate, p. lxxv. edit. 1794. The ships employed were 2,234. Ib.

CHAPTER IV.

CLIMATE AND SEASONS.—FACE OF THE COUNTRY.—SOIL AND AGRICULTURE.—RIVERS.—LAKES.—MOUNTAINS.—FORESTS.—BOTANY.—ZOOLOGY.—MINERALOGY.—MINERAL WATERS.—NATURAL CURIOSITIES.

CLIMATE AND SEASONS. THE climate of Scotland is such as might be expected in a latitude so remote, and a country so mountainous. In the eastern parts there is not so much humidity as in England, as the mountains on the west arrest the vapours from the Atlantic. On the other hand, the western countries are deluged with rain, an additional obstacle to the progress of agriculture; indeed, the chief obstacle, for the example of the Swiss evinces, that industry can overcome even mountains; but the climate of Swisserland is dry and pleasant, and no toil can guard against the excess of falling moisture. Even the winter is more distinguishable by the abundance of snow, than by the intensity of the frost; but in summer the heat of the sun is reflected with great power in the narrow vales between the mountains, so as sometimes to occasion a phenomenon of glittering particles, that seem to swim before the eye. These observations chiefly apply to the north and west. In the east and south the climate differs but little from that of Yorkshire; and corn sometimes ripens in the vales of Moray, as early as in Lothian.

FACE OF THE COUNTRY. The face of the country is in general mountainous, to the extent, perhaps, of two-thirds; whence the population is of necessity slender, in comparison with the admeasurement. But the name of Highlands is more strictly confined to Argyleshire, the west of Perthshire, and of Inverness; and the entire counties of Ross, Sutherland, and Caithness. In proceeding from the south-east, the entrance into the Highlands near Dunkeld, is very impressive, there being a considerable tract of plain, just before what may be termed the gates of the mountains. Even the eastern parts have little of uniform flatness, but are sweetly diversified with hill and dale. What in England is called a hill, would often in Scotland be regarded as a mere slight rise in the road. The rivers in general are remarkably pure and transparent, and their course rapid. The rich roughness of an English prospect, diversified with an abundance of wood, even in the hedge-rows, is in Scotland rarely visible; whence the nudity of the country makes a strong impression on the stranger. But the laudable exertions of many of the nobility and gentry, who plant trees by millions, will soon remove this reproach. The maritime gales are noxious to such plantations, but it has been recently discovered in France, that

there is a common tree (the name is unfortunately forgotten) which will remain unhurt, even on the beach; and if a thick skreen be first formed of this tree, and suffered to attain some maturity, other denominations will prosper under its protection*.

Soil and Agriculture. For a minute account of the various soils that prevail in Scotland, and the different modes of agriculture, the reader must be referred to the Statistical Accounts, published by Sir John Sinclair. The excellence of the English agriculture, has justly entitled it to an imitation, almost universal. But this advantage is of recent date; and, for a long period of time, Scotland was remarkable for producing the best gardeners, and the worst farmers in Europe. The superior advantages of great, or small farms, have been recently discussed with much care, as the importance of the subject demands. It would seem, that for the first great improvement of a country, the farms should be large, that the farmer may have a sufficient capital to make experiments, and discover the most productive crops, or those most suited to the nature of the soil. When lasting examples have thus been instituted, it is certainly more advantageous for the community, that the farm should be restricted to a small or moderate size.

Rivers. The three chief rivers of Scotland, are the Forth, the Clyde, and the Tay.

Forth. The chief source of the Forth is from Ben Lomond, or rather from the two lakes, Con and Ard: the stream of Goudie soon joins it from the lake of Menteith; and the river Teith, fed by the lakes Ketterin, Lubnaig, and others, swells the Forth to a noble stream, about four miles above Stirling.

Clyde. The Clyde is said to issue from a hill in the S. E. corner of Tweeddale, called Arrik Stane, which is undoubtedly the chief source of the Tweed, and one source of the Annan: but the Clyde has a more remote source in Kirshop, or Dair water, rising about six miles further to the south, in the very extremity of Lanarkshire; and the true source of the Annan seems to be Loch Skeen, in the county of Selkirk. However this be, the Clyde passes through Crauford Moor, leaving the range of Leadhills on the left, and winding under the lofty hill of Tinto, near Symington, pursues a northerly course, till about two miles to the south of Carnwath, when it assumes its chief westerly direction.

Tay. The principal source of the Tay, is the lake of the same name, or the river may be traced to the more westerly sources of the Attrick and the Dochart, and the smaller stream of Lochy; which fall into the western extremity of Loch Tay. Soon after this noble river issues from the lake, it is joined by the river Lyon; and, at no great interval, by the united streams of the Tarf, the Garry, and the Tumel, the last a rapid and romantic river. The streams of Ericht and Ilay, swell the Tay, about nine miles to the north of Perth; after passing which city, it receives the venerable stream of the Ern, and spreads into a wide estuary.

* Another useful plan is to sow or plant the seeds and trees very thick, or to sow them with heath, as in Mecklenburgh. The sycamore will bear the sea-spray.

TWEED. Next in consequence, and in fame, is the Tweed, a beautiful and pastoral stream, which, receiving the Teviot from the south, near Kelso, falls into the sea at Berwick.

The Scottish Tyne is an inconsiderable river, which runs by Haddington.

ANNAN. In the south-west, the Annan contributes largely to the Frith of Solway, but no town worth mentioning adorns its banks. Dumfries stands upon the Nith, a river of longer course than the Annan, and marked at its estuary by the ruins of Carlaveroc castle, an important fortress in ancient times. The river Ore, and that recently styled Kirkudbright, anciently and properly called the Ken, (whence is derived the title of Kenmure,) and the Fleet, are surpassed by the river Cree, or Crief; which formerly split Galloway into two divisions, and which opens into the noted bay of Wigton.

The rivers of Ayrshire, flowing into the grand estuary of the Clyde, are of inconsiderable size.

EDEN. To the north of the estuary of Forth, occurs the Eden, which, after watering the royal park of Falkland, and Coupar, the county town, meets the Ocean, about two miles to the north of St. Andrews.

To the north of Tay are the South Esk, which passes by Brechin and Montrose; and the North Esk, a less considerable stream, but both impart titles to Earls.

DEE. In the county of Kincardine there is no river of consequence. But the Dee is a considerable and placid stream, issuing from the mountains of Scairsoch, and pursuing a due easterly course to Aberdeen. The Don runs almost parallel, a few miles to the north, joining the sea about two miles from Aberdeen, after passing Old Aberdeen, or rather, in the old orthography, Aberdon.

A few miles to the north of the Don, the river Ythan falls into the German ocean, a stream formerly celebrated for its pearl fisheries, of which some relics remain. The Uggie is the last stream of any consequence in Aberdeenshire.

The following rivers direct their course to the north. The Devron joins the sea at Bamf.

SPEY. The Spey is a grand and impetuous river, rising from a small lake, called Loch Spey, in the vicinity of the high mountain of Corriarok, near Fort Augustus, whence it rolls to the south-east, amid mountainous wilds, till it suddenly turns to its fixed direction, the north-east, being perhaps, upon the whole, the most considerable Alpine river in Scotland.

The water of Lossie is only remarkable, as it washes the venerable remains of Elgin; but Findorn, which runs by the Forres of Macbeth and Shakspeare, is a considerable torrent.

NESS. The Ness, issuing from the lake so called, and the Beuly, conspire to form the large estuary, called Murray Firth; while that of Cromarty is formed by the Grady, the Conon, and other streams.

The estuary of Dornoch is formed by a river which issues from Loch Shin, by the Caran, and by the intermediate stream, called Okel.

The other streams in the furthest north of Scotland, are unhappily of small consequence. The water of Thurso, and that of Naver, are the chief. In the north-west extremity are the Strathmore, the Strathbeg, and the Durness, which enters the sea to the east of the stupendous promontory of Cape Wharf, now modernized Wrath.

Western Inlets. On the west of Scotland there is no river of any moment; but the defect is compensated by numerous lakes, or rather creeks, of which the most considerable are Laxford, Calva, Ennard, and that of Broome, which forms a noble bay, studded with islands, nearly parallel with the bay of Dornoch. On its shore is the projected settlement of Ullapool, to which every patriot must wish success*. Next are the En and the Gare, the Torridon, the Kessern, and others of smaller note. Argyleshire exhibits the Sunart, a long inlet, which terminates at Strontian; and the Linny, extending to Fort William. The Etif is impeded by a singular cataract, at its entrance into the sea. The small inlet of Crinan attracts observation, by the promised canal; and the list is closed by Loch Fyne, and Loch Long, forming vast inlets from the estuary of Clyde.

Lakes. Among the lakes of Scotland, the chief in extent and beauty is that of Lomond, studded with romantic islands, and adorned with shores of the greatest diversity. The isles are supposed to form part of the Grampian chain, which here terminates on the west. The depth of this lake in the south, is not above twenty fathoms; but the northern creek, near the bottom of Ben Lomond, is from sixty to eighty fathoms. At the time of the earthquake in Lisbon, 1755, the waters were agitated in a singular manner.

Ketterin, &c. On the east of Lomond is an assemblage of curious lakes, the Ketterin, or Cathein, the Con, or Chroin, the Ard, the Achray, or Achvary, the Vanachor, the Lubnaig; exhibiting singular and picturesque scenes, called by the Highlanders the *Trosachs*, a word signifying rough, or uneven grounds†. This denomination is strictly applicable to the surrounding hills, and rocks, of distorted forms, as if some convulsion had taken place; but often covered with heath, and ornamented even to the summits, with the weeping birch. The hills are of argillaceous schistus; in other words, in strata of coarse slate, mostly vertical, and interspersed with veins of quartz. Ketterin, or Cathein, is a lake of considerable extent and beauty, with some rocky isles, and crowned by the mountain of Ben Veney: the fish are trout and charr. Vanachor has salmon and trout; but Achray only pike, tyrants without subjects. The Con, the Ard, and Lubnaig, have not been celebrated by tourists.

Menteith. In the vicinity is the lake of Menteith, a beautiful small lake, about five miles in circumference, with two woody isles, one presenting the ruins of a monastery, the other those of a castle of the old Earls of Menteith.

Having thus briefly described the principal lake, and some others in its vicinity, it may be proper to observe, before proceeding to others in

* Loch Broome extends about twelve miles into the country, and is surrounded with mountains of marble and lime-stone. Knox. ii. 465.

† Garnet's Tour, ii. 173.

a more northerly situation, that the S. W. region of Scotland, anciently called Galloway, contains several picturesque lakes, (which, in Great Britain and Ireland, seem always to accompany groupes of mountains,) though not of equal extent and celebrity with those of the north. The most considerable is the lake of Ken, in the county of Kirkudbright, on which stands a village called New Galloway. This lake is decorated with three small isles. Next is that of Crey, on the borders of Wigtonshire. In the county of Ayr there is a small lake, called Loch Dolen.

Returning towards the north, Loch Leven, in Fifeshire, attracts observation from its historical fame. The lakes in the south of Perthshire, have been already mentioned, and to the east must be added Loch Ern, Loch Tay, and those of Rannoch, Lydoch, and Ericht. That of Tay, in particular, is a grand and beautiful expanse of water, of such length, as rather to resemble a noble river; and at its eastern extremity, are placed the capital mansion and plantations of the Earl of Braidalbin. Those more to the north of this county, may present many yet unseen and unknown beauties.

Loch Ness. Loch Ness rivals Loch Tay in extent and reputation. This lake was also affected at the time of the earthquake at Lisbon. The depth is from sixty to one hundred and thirty-five fathoms: the fish, excellent trout*. Its great depth is the cause why it never freezes. It is remarkable that the bed of this lake, and in general of the watery chain which extends to Loch Linney, is filled with farcilite, or pudding-stone, hills of which occur near Dunolla and Dunstaffnage, on the western shores of Argyle. The counties of Sutherland and Caithness, contain many small lakes.

Loch Loil. The chief are Loch Loil, which sends a stream into the bay of Far; and Loch Shin, a considerable lake, in a country little known or visited. According to the description of Mr. Cordiner†, it is a charming piece of water, of great extent, winding among the hills, with woods, often stretching down to the shores. It is said to be twenty miles in length, but the eye can only command a few miles at a time. From its south-east extremity issues the river Shin, in two broad cascades, from the sides of a small island. Mr. Cordiner adds, that by a singular error in Dorret's map, the distance from Larg church, on the S. E. of Loch Shin, to Moasdale, south of Loch Naver, measures only five miles, while by computation in travelling, there are at least eighteen. But Dorret's map, though valuable for the time, is stained with numerous and gross errors; and Loch Naver lies almost due north of Shin, instead of due east.

Many of the lakes in the western division of Scotland have been already mentioned under their proper description, as creeks or bays. Among a few others which deserve notice, may be named Loch Fainish, a considerable lake in Rosshire; the lakes Lochy and Laggen, in the county of Inverness. Loch Awe, in Argyleshire, is the most considerable lake in the west of the Highlands; it is about thirty miles in length, and from one to two in breadth; and is studded with many

* Pennant's Tour.

† Letters to Mr. Pennant, London, 1780. Quarto, p. 117.

small, woody isles, one of which bears the ruins of a monastery, and another those of an ancient fortress, the residence of the Campbells of Loch Awe, afterwards Dukes of Argyle. This lake empties itself, by a considerable stream, near its northern end, into the creek, called Loch Etif.

Mountains. But the chief distinctive feature of Scotland, consists in its numerous mountains, which intersect the country in various directions. In the south-west, the ancient province of Galloway presents an extensive assemblage of hills, which seldom describe any uniform chain, from the bay of Glenluce, which extends towards Loch Ryan, and thence, in a N. E. direction to Loch Doon, the source of the river Doon, which joins the sea near Ayr. Other ridges run in various directions, generally north and south, according to the course of the rivers, till we arrive at the Nith, near which is Cruffel, a detached summit, of considerable height. According to General Roy, than whom there cannot be a better authority, the mountains of Galloway form a connected chain with those of Cheviot, on the N. E.

But the chief elevation in this part of Scotland, is that metalliferous ridge in its very centre called the Lead Hills, &c. whence many rivers descend in all directions to the sea. The small stream of Elvan conveys particles of gold to the Clyde, and German miners are said to have discovered considerable quantities of that precious metal. The chief summit of that ridge is Hartfell, which, according to some accounts, is 3300 feet above the level of the sea; but by others 2582. Cruffel is only 2044. Not far to the north is Tinto, a remarkable solitary mountain; and Queensberry-hill is about the same elevation. Loudon-hill, in Ayrshire, is little memorable; but on returning to the east, we find the uniform ridge of Lamermoor, terminating in St. Abb's-head. The hills of Pentland, on the south of Edinburgh, are rather picturesque than important. Berwick Law, and the romantic summits in the vicinity of Edinburgh, close the list of the southern hills. The Lead Hills chiefly consist of argillaceous schistus; but the grey granite abounds in the mountains of Galloway. In all, however, the chief portion seems to be calcareous; the summits are round, some verdant, others covered with heath. The red granite, and other grand Alpine rocks seem here unknown. In the Lothians, the calcareous strata support vast masses of whin, trap, and basalt, which extend to the northern shore of the frith of Forth. On the east and west of Inverkeithing, are whin and columnar basalt*; the latter also occuring at Dichmont-hill, near Rutherglen, in Lanarkshire, and at Dumbarton.

Ochill. On passing the Forth, appears the range of Ochill-hills, more remarkable for their singular agates and calcedonies, than for their height; and to finish the account of the Lowland hills, must be added those of Kinnoul and Dunsinnan, in the east of Perthshire, and a small range in Angus. In the county of Kincardin, the great chain of the Grampians terminates. On the north-east of Aberdeenshire, is Mormond, a remarkable solitary summit; from whence no

* Mr. Aikin's Notes.

mountains of note occur till Inverness, on the west, opens the path to the Highlands. Yet, it must not be forgotten, that from the lofty promontory of Trouphead, to Portsoy, extend vast masses of beautiful red granite, interspersed with schorl; and of serpentine with steatites, and other valuable stones. The Cape called Kinnaird-head, near Frazerburgh, presents curious micaceous schistus; but the eastern shore offers nothing worthy of remark. Before leaving the Lowland hills, it may be observed that the small ridge in Fifeshire, between the Eden and Leven, called Loman-hills, consists mostly of hard free-stone, with superincumbent strata of whin and basalt: while that separating the plain of Kinross from Strathern, is on the south side whin, and on the north toad-stone, with calcareous spar, and steatites. Soon after occur the Alpine rocks of siliceous and micaceous schistus*. In general, the observation of Saussure is applicable, that mountains gradually rise from the calcareous to the micaceous, and thence to the granite.

Grampian Hills. The Grampian hills may be considered as a grand frontier chain, extending from Loch Lomond to Stonehaven, and forming the southern boundary of the Highlands, though four or five counties on the north-east of that chain, have, in their eastern and northern parts, the name and advantage of Lowlands. The transition to the Grampians is gradual, the first chain, according to General Roy, consisting of the Sadley-hills on the east, the Ochils in the middle, and Campsy-hills on the west. To the Grampian chain belongs Ben Lomond (3262); Ben Ledy (3009); Ben More (3903); Ben Lawres, the chief summit (4015); Shihallion (3564); Ben Verlich (3300); and other less important elevations on the east. Mount Battock in Kincardinshire, is 3465 feet. Ben Cruachan, in Argyleshire, is a solitary mountain, of 3300 feet above the sea.

Ben Nevis. Ben Nevis is the highest mountain in Great Britain, being estimated at 4350 feet above the level of the sea, not much above a quarter of the height of Mont Blanc. This mountain has not hitherto been explored by any mineralogist. On the N. E. side it presents a precipice, nearly perpendicular, and of prodigious height, by some accounts 1500 feet. The view from the summit is grand†, exhibiting most of the western Highlands, from the paps of Jura, to the hills of Cullen in Skey; on the east it extends to Ben Lawres, in Perthshire, and the river Ness; extent of view about eighty miles. The superior half of the mountain is almost destitute of vegetation. The summit is flat, with a gentle acclivity, and forms an easy pavement, propably of granite. Snow remains in the crevices throughout the year; but here are no glaciers, nor other magnificent alpine features‡.

It would be difficult to divide the remaining mountains of the Highlands into distinct lines or groupes: they shall, therefore, be briefly mentioned in the order of proximity.

* Aikin's Notes.

† Statist. Acc. viii. 414.

‡ Drumalban, the *Dorsum Britanniæ* of the old writers, seems to be Ben Nevis, with the high desert Moor of Rannoch, extending twenty miles to the east of that mountain.

CORRIAROK. To the N. W. of Ben Nevis is the long mountain of Corriarok, near Fort Augustus, over which a military road has been directed, in a zig-zag direction. From the foot of this mountain arises the rapid river Spey; and other streams run to the west, circumstances which indicate great elevation.

CAIRNGORM. About thirty miles to the east, rises the mountain Cairngorm (4060 feet), or the blue mountain, clothed with almost perpetual snow, and remarkable for quartz of different colours, chiefly the smoky kind, well known to lapidaries. The other chief mountains in this region, are those of Braemar, or Scairsoch, at the source of the Dee; Ben Awn, and many of smaller height, such as Benibourd*, Benachie, &c.

In the second division of the Highlands, which lies beyond Loch Linny and Loch Ness, the mountains are yet more numerous, but not so memorable. The western shore, in particular, is crowded with hills, from the island of Skey to cape Wrath, while a branch, spreading eastward towards Ord-head (1250 feet) forms, what are termed by seamen, the Paps of Caithness (1929 feet). The chief mountains on the west of Rosshire, are Ben Chat, Ben Chasker, Ben Golich, on the south of Loch Broom; Ben Nore, on the north of that commodious haven; and the hills of Cuinak, on the south of Calva bay, or in the native language Kylis-Cuin. More inland, are Ben Foskaig; and the chief mountain in this district, Ben Wevis (3720 feet).

On proceeding to the most northern parts of Scotland, the counties of Sutherland and Caithness, first occurs Ben Ormoid; then Ben Cliberg, on the west of Loch Naver; and Ben Grim, to the north of which extends the chain, called the Paps, consisting of the mountains Morben, Scuraben, &c. from which run in a northerly direction, according to the course of the rivers, inferior chains, as that of Ben Maddy, on the east of the river Naver, &c. The N. W. extremity of Scotland presents some pleasant vales towards the sea, and inland that of Dornadilla, and an elevated plain on the west of Loch Loial, called Dirrymore forest†: that district called Rae's forest, consists of a bed of rock, interspersed with patches of morass. The chief mountains are Ben Hop, and Ben Lugal: further to the west no names occur, except that of Cape Wrath, and the region is described by an intelligent traveller in the following terms‡.

CAPE WRATH. "But a wide extent of desert country lay before us, and exhibited a most august picture of forlorn nature. The prospect was altogether immense, but wild and desolate beyond conception. The mountains presented nothing to view but heath and rock; between them formless lakes and pools, dark with the shades thrown from prodigious precipices, gave grandeur to the wilderness in its most gloomy forms." Curiosity has been appalled, and no traveller has penetrated into the wilds of Ashir, for such is the name of this district, which is by our seamen corrupted into Old Shores; but from

* Always covered with snow, and, perhaps, as Mr. Aikin conceives, higher than Cairngorm. About the height of 4000 feet, snow remains all the year in Scotland.

† Cordiner's Letter to Pennant, p. 111.

‡ Ibid. 104.

the vast caverns in the vicinity of Cape Wrath, it is probable that the environs are chiefly calcareous*.

Having thus explained at some length, the directions and positions of Scottish mountains, because they constitute the most remarkable feature of the country, and yet have never received due illustration, their constituent parts remain to be briefly examined†. On entering the Highlands, near Dunkeld, the first ridges are alluvial hills of gravel, containing pebbles of micaceous schistus, quartz, and granite, sometimes surmounted by slate, and argillaceous schistus. The rocks immediately to the north of Dunkeld, are composed of micaceous schistus, penetrated in every direction by veins of quartz. From the junction of the Tay and Tumel, westward to Loch Tay, the northern bound of the vale is of the same substances, sometimes interspersed with garnets. The whole summit of the higher chain is covered with large rounded masses of granite. The southern shores of Loch Tay, consist of micaceous schistus, with a few garnets, interrupted about the middle with banks of compact bluish grey lime-stone. The northern shores similar, but the lime-stone is micaceous. The mountains in Glenlochy are mostly of micaceous schistus, interspersed with garnet: Glen Lyon presents small veins of lead. The vale of Tumel, between Loch Tumel and Loch Rannoch, is overspread with rounded fragments of granite and micaceous schistus, but contains granitoid, and some granite. The lower part of Glen Tilt chiefly exhibits micaceous schistus: the upper principally granite and lime-stone.

Such are the more southern parts of the Highlands. In the west, towards Ben Lomond, micaceous schistus also abounds; but that mountain is chiefly of gneiss, and the like features are found in the peninsula of Cantire. In the north of Argyleshire‡, appears the beautiful red granite, which chiefly constitutes the central chain, already indicated; to the north of which first appears micaceous schistus, and afterwards a remarkable course of pudding-stone, extending from Loch Ness to Oban‖. The mountains in the north have been little explored, but Mr. Jameson tells us, that the coast is chiefly a coarse argillaceous sand-stone, often appearing in the form of flags, while in some places are masses of breccia, being pebbles of red granite, micaceous schistus and quartz, in arenaceous bases. Mount Scuraben is at the bottom sand-stone, and sand-stone flag, then the breccia, succeeded by a rock of white quartz to the summit, and probably forming the root and centre of the whole. Morben, and other mountains in this

* Statist. Account, vi. 279. (Parish of Edrachills.) The account of the interesting parish of Durness, in which Cape Wrath stands, vol. iii. 576, is very lame and defective; if we trust the author, p. 579, the whole parish is lime-stone, and Cape Wrath affords excellent pasturage for sheep.

† Mr. Aikin's Notes.

‡ Cruachan, according to Mr Jameson, consists, at the bottom, of slate and micaceous schistus which is followed by granite to the top. Near Strontian are red granite and gneiss. Glen Co presents curious porphyries.

‖ According to Williams, II. 159. a like range extends through Perthshire, into Monteith and Dumbartonshire, crossing the Clyde, near Dumbarton, and reaching the west side of Ayrshire, where it enters the Frith of Clyde; it hence seems to follow, in the same direction, the grand granitic chain of Scottish mountains.

district, from their white colour seem to be of the same composition. About the Ord of Caithness appear granite and micaceous schistus, and that mountain consists of mingled quartz and felspar. Near Dornoch, the rivers roll pebbles of micaceous schistus and granite, evincing the materials of the mountains, but their lower strata consist of argillaceous sand-stone, till near Tain, where are granite, micaceous schistus, and hornblende. The sand-stone and breccia re-appear at Cromarty, and at Murray Frith, but at Fort George the primitive rocks begin. About two or three miles south of Aberdeen, the red-coloured argillaceous sand-stone and breccia again occur; and the castle of Dunbtter stands on a rock of the latter substance.

The central and western parts of Sutherland and Rosshire, have not been explored; but it would seem that the west of Sutherland is chiefly primitive limestone, which is well known to form a great part of Assynt, and sometimes contains masses of white marble. The mountains seem to be of granite and micaceous schistus, but often present the singular feature of vast summits formed of white quartz. According to Williams, this quartz is stratified, and tinged with blue, or bluish grey; and bears no vegetation, so that at a distance it resembles snow. Near Loch Broom is found that sort of granite which is best adapted for mill-stones.

Upon the whole it would appear, that the chief, or granitic chain of the Scottish mountains, extends in a S. W. and N. E. direction, from Ben Nevis to Portsoy. In many parts it has sunk or subsided, as not unusual, but the line is marked by the gradual transitions from lime-stone and sand-stone, to micaceous schistus, and thence to granite. Ben Nevis, Cairngorm, and other lofty summits, mark this primitive chain. The Grampians, which form the outer skirt of this chain, consist, according to a German mineralogist*, of micaceous lime-stone, gneiss, porphyry, slate, and granite, alternating with each other; and another German says, that the fundamental rock of the country consists of granitic aggregates. The mountains in the S. W. are chiefly schistose, and the granite is grey, and of an inferior kind; but Mr. Williams informs us, that Ben Nevis, and other mountains in that quarter, are composed of elegant red granite, in which the pale rose, the blush, and the yellowish colours, are finely mixed and shaded†. The like granite is found at Portsoy and Trouphead, and is probably continued through the whole chain, the superior height of the region being marked by the extreme rapidity of the river Spey. This tendency of the leading chain, is not only marked out by the Grampians, but by that of the islands, and of the grand chain in Norway, which, indeed, seems a continuation of the Scottish chain, and the last, probably contains silver as well as the Scandinavian. The mountains on the N. W. of the lakes Ness and Linny, are probably only exterior skirts of the same chain, and present the usual declension of micaceous schistus, terminating in lime-stone, and sand-stone, in the northern parts of Sutherland and Caithness. The islands of Shetland chiefly present micaceous schistus, interspersed with a few masses of granite; and the Orkneys, &c. consist mostly of sand-stone. The

* Kirwan's Geol. Essays, 481. † Mineral King. II. 13.

western islands may be supposed to be chiefly calcareous. It is remarkable that the space from Inverness to Dunolla, on the west, abounds with farcilite (pudding-stone) composed of pebbles of quartz, probably washed down from the granitic chain, and afterwards cemented by some unknown process of nature, either by iron or siliceous earth.

General Roy mentions two remarkable features of the Highlands, first the moor of Rannoch, a high desert of twenty miles square, on the S. E. of Ben Nevis, a flat uninhabited morass. The second is part of the N. W. coast, extending from Loch Inchard, twenty-four miles to the south, breadth about ten miles, which presents a most singular appearance, as if mountains had been broken into fragments, interspersed with pools of water. The northern extremities of Caithness, are low and morassy, and seem calcareous, as well as those of Sutherland.

The forests of Scotland are very rare in the proper acceptation of the term; and the Sylva Caledonia has long since vanished. The whole county of Selkirk was formerly denominated Ettric forest. There was also a considerable forest, that of Mar, in the west of Aberdeenshire, where now remains the forest of Abernethy*, extending to Cairngorm. In the county of Sutherland was the forest of Sletadale, on the north of Dunrobin, the seat of the earls of Sutherland; and in the north of the same county, are marked Parff-forest, between Ashir and Dunan (probably originally Wharf forest, by the same name as the cape); to the south of which were Reay forest, or that of Dirrymone; with those of Dirrymore, and Dirrymena, on the north and south of Loch Shin. No other forest occurs till we reach the county of Argyle, which contains Boachiltive forest on the north. Mention is made by late travellers of a royal forest near Loch Ketterin, called Finglas; but for this there seems no authority. The forest of Athol, in the same county, does not appear liable to the same objection.

Botany. Having given a general account of the indigenous plants of England, it will suffice, for the botany of Scotland, to point out the particulars in which the two floras differ, together with the causes of the difference.

The northern part of Britain differs from the southern as to climate, in being colder and more rainy; and as to soil, in consisting chiefly of mountainous, granitic, or micaceous districts, the highest peaks of which are buried in perpetual snow. There are no chalk-hills in Scotland; nor any of that soil which characterises the south-eastern part of the island, and is composed, for the most part, of sand and calcareous marl. We might, therefore, *a priori*, expect to meet with more alpine plants in Scotland, than of those which flourish best in a light, chalky soil, and in a mild climate; this is found to be in fact the case. The greater number of vegetable species is the same in both countries; but the warm, moist region of Cornwal, Devonshire, and Dorset; the range of chalk-hills, on each side of the valley of the Thames; the dry, sandy tracts of Norfolk, Suffolk, and Cambridge, and the fens of Lincolnshire, contain many plants that are unknown to Scotland; as, on the other hand, the snowy summits of the Grampians, the extensive forests,

* Prov. of Moray, Aber. 1798. 8vo. p. 267.

of Badenoch and Braemar, and the bleak, shelterless rocks of the Hebudes, possess many hardy vegetables, which are not to be found in England. South Britain contains a greater number of species peculiar to itself; but those that are similarly circumstanced in the northern part of the island, are of more frequent occurrence, and therefore more characteristic: to the English botanist, Scotland will have more the air of a foreign country, than England will to a Scottish naturalist. Amidst the grand romantic scenery of the Highlands, the search of the English botanist is continually solicited and repaid, by the appearance of plants, either altogether new to him, or which he has been accustomed to consider as the rare reward of minute investigation. In traversing the vast natural forests of birch and pine, although his notice will be first attracted by the trees themselves, in every stage of growth, from the limber sapling, to the bare and weather beaten trunks, that have endured the storms of five or six hundred winters, yet the new forms of the humbler vegetables will soon divide his attention; the red and white blossoms of the trailing *Linnæa*, the *Pyrola secunda*, and *uniflora*, *Satyrium repens*, *Ophrys corallorhiza*, and *Convallaria verticillata*, will each attract their share of regard. If he be winding along the rocky margin of Loch Tay, or Loch Ness, the *Eriocaulon decangulare*, the alpine *Circæa*, the minute *Subularia aquatica*, will reward his labour; the moist and shady recesses of the slate mountains, are carpeted by the three *Veronicas*, the *Alpina*, the *saxatilis*, and *fruticulosa*; by the *Saxifraga umbrosa*, the *Thalictrum alpinum*, and *Erigeron alpinum*. In the thin peat moors that overspread the rocks, are found the *Schoenus rufus*, *Scirpus multicaulis*, *Jucus trifidus*, *biglumis*, and *spicatus*, all of them belonging to the natural class of rushes; with the Alpine cotton-grass, the *Tofieldia palustris*, a few *carexes*, and some of the dwarf species of *willow*. The mountainous districts of granite are peculiarly rich in alpine plants; the ledges and crevices of the rocks are adorned by tufts of the golden cinquefoil (*Potentilla aurea*); and luxuriant festoons of the *Arbutus alpina*, and *Arbutus uva ursi*, glowing with their scarlet and deep blue berries, among their glossy leaves; the less precipitous parts, and the borders of the torrents, are overspread with alpine grasses, with the viviparous *Polygonum*, the *Azalea* and *Sibbaldia procumbens*, the yellow *saxifrage*, (*Saxifr. aizoides cernua* and *rivularis*,) the *Dryas octopetala*, (mountain avens,) *Rhodiola rosea*, *Rubus arcticus*, and the alpine *Alchemilla*, *Epilobium*, and *Serratula*. The cloud-berry (*Rubus chamæmorus*), and some of the *lichens* flourish amidst the snow and solitude of the most elevated summits; and afford at the same time shelter and food for the Ptarmigan, almost the only one of our native birds that can inhabit so cold a situation. The Lowlands of Scotland seem to contain no plants which are not found in similar soils in England; the sea-coast, however, exhibits two umbelliferous vegetables, the *Ligusticum Scoticum*, and *Imperatoria Ostruthium*, which cannot be met with on the southern shore.

Of the plants that are peculiar to South Britain, the number of species, and, indeed, of entire genera, are so considerable, that to enumerate the whole would be an endless task; the following are some of the principal.

The proper bulbous rooted, are almost entire strangers to Scotland; of the genera *Crocus*, *Galanthus*, *Leucojum*, *Narcissus*, *Fritillaria*, and *Tulipa*, this country does not possess a single species. Several kinds of the *Orchidea*, which grow on chalk and lime-stone, as well as the whole genera of *Sesleria* (blue moor-grass); *Polemonium* (Jacob's ladder); *Rubia* (Madder); *Impatiens Clematis* (Virgin's bower); *Hedysarum* (Saintfoin); *Athamanta* (stone parsley); *Poterium* (burnet); and *Buxus* (box-tree), are equally unknown. The tracts of sand in England, abound with plants that do not occur in Scotland; such are the genera *Exacum*, *Tillea*, *Herniaria*, *Delphinium* (larkspur), and *Vella*. The sea-coast and salt-marshes of Scotland, are deficient in many genera that are by no means uncommon in the southern part of the island; of which the principal are *Rotbollia* (sea hard-grass); *Polycarpno*, *Tamarix* (Tamarisk); *Corrigiola*, *Frankenia*, *Pisum* (Pea), and *Santolina* (sea-cotton). Lastly, a few of the more succulent aquatics, as the *Acorus*, *Stratiotes*, and *Sagittaria*, are rarely, if ever, observed north of the Tweed.

Zoology. The Zoology of Scotland presents little remarkable, as distinct from that of England. The small horses of Galloway seem to have been a primitive breed, and, in diminutive size, are exceeded by those of Shetland. The cattle in Galloway are often without horns, a defect which is supposed to be recompensed by the superior quantity and quality of the milk. The kylies, as already mentioned, are a middle-sized breed from the province of Kyle, and other districts of Ayrshire and Galloway. On the east are found large cattle, of various breeds. The sheep are smaller and shorter than those of England, but are now crossed in various directions; those of Shetland are remarkable for the fineness of the wool, which is, however, interspersed with coarser piles. Goats are not so numerous in the Highlands and Isles, as might be expected: this animal not only enlivens the Alpine landscape, but yields useful leather and milk, and might occasionally supply the want of other provision. Of dogs, no breed is remembered peculiar to Scotland; but the shepherd-dogs in the province of Galloway, are endowed with remarkable sagacity, so as to understand and execute even complicated commands.

Of wild animals, the wolf has been extirpated in Scotland, only since the year 1680. The wild cat is still occasionally found; the other classes correspond with those of England, except that the roe is still not unfrequent. Among the birds, eagles are not unknown, nor elegant falcons. The shores and islands present numerous kinds of seafowl. In the progress of cultivation, some new birds have appeared from England; for instance, the golden-crested wren, which even visits Shetland, after a flight of sixty miles, which is surprising for so diminutive bird*: but the nightingale, who would be a most welcome guest, still refuses the journey.

Scotland abounds with fish of all kinds, and contributes great supplies to the English market, particularly in lobsters and salmon. By some singular chance, the holibut, a coarse dry fish, is in Scotland styled the turbot, which in Scotland is called *Rodden-fleuk*, the last

* Pennant's A. Z. vol. i. 39.

word being a general denomination for flounders and other flat fish. The transparent lakes, rivers, and rivulets of Scotland, present a beautiful variety of fish: on the northern and western coasts are numerous seals; and it appears from the life of St. Columba, that the ancients had a mode of rendering them tame, and obedient to the call. The whale sometimes appears, and the basking shark frequently plays in the western inlets. Pearls are found in the rivers Teith and Ythan, in a large kind of mya, or muscle. Some large ones are in the shape of a pear, others are pink on one side. Many beautiful zoophites, on the northern shores, have been found and introduced to public notice, by Mr. Cordiner.

Mineralogy. In considering the mineralogy of Scotland, it may be premised, that a country so mountainous must be naturally expected to abound with metals, and some fortunate accident may, perhaps, discover in some of the skirts of the granitic chain, silver mines, equal to those of Norway; for such discoveries arise not from a sedulous or skilful inquiry, but from the trifling accidents of a shower of rain, of a shepherd running after a goat, or the like. Mr. Kirwan has given an excellent account of the various substances in which metals are generally found*. In granitic mountains, tin, lead, iron, zinc, bismuth, cobalt; and in gneiss, or schistose granite, silver, copper, lead, tin, and zinc. In micaceous schistus are found copper, tin, lead, antimony; in hornblende slate, copper ore; under argillite, or common slate, silver, copper, lead, zinc. In steatite, sulphureous pyrites, and magnet. In primitive lime-stone, appear copper, lead, zinc; and even in strata of coal, have been found native silver, galena, and manganese. The small quantity of gold found in Scotland, has been procured from the Lead-hills, which are mostly composed of coarse slate. This precious metal first appeared, as already mentioned, in the sands of Elvan, a rivulet which joins the Clyde, near its source; and a place still exists, called Gold-scour, where the Germans used to wash the sand. None worth mentioning has been found recently. The silver generally accompanies lead; and in the rich mines of Saxony, the baser metals were found near the surface, but the richer at a great depth. The silver found in Scotland, has hitherto been of little account; the chief mine was that at Alva, which has since only afforded cobalt. Nor can Scotland boast of copper, though a small quantity was found in the Ochills, near Alva, with silver and cobalt; and it is said that the islands of Shetland offer some indications of that metal. Copper has also been found at Colvend in Galloway, at Curry in Lothian, at Oldwick in Caithness, and Kissern in Rosshire.

The chief minerals of Scotland are lead, iron, and coal. The lead mines in the south of Lanarkshire, where the gold was also found, have been long known. Those of Wanlock-head, are in the immediate neighbourhood, but in the county of Dumfries, and belong to another proprietor. Some slight veins of lead have also been found in the western Highlands, particularly Arran. Iron is found in various parts of Scotland; the Carron ore is the most known, which Mr. Kirwan describes as being an argillaceous iron-stone, of a bluish grey, inter-

* Geol. Ess. 428.

nally of a dark ochre yellow*. It is found in slaty masses, and in nodules, in an adjacent coal mine, of which it sometimes forms the roof. At the Carron-works, this ore is often smelted with the red greasy iron ore from Ulverston, in Lancashire, which imparts easier fusion, and superior value. Calamine, or zinc, is also found at Wanlockhead; and it is said that plumbago and antimony may be traced in Scotland.

But the chief mineral is coal, which has been worked for a succession of ages. Pope Pius II, in his description of Europe, written about 1450, mentions that he beheld with wonder, black stones given as alms to the poor of Scotland. But this mineral may be traced to the twelfth century. The earliest account given of the Scottish coal mines is contained in a book, published by one George Sinclair, who calls himself Professor of Philosophy at Glasgow, but I cannot trace him in the University list†. He explains, with some exactness, the manner of working coal; and mentions the subterraneous walls of whin which intersect the strata, particularly a remarkable one, visible from the river Tyne, where it forms a cataract, and passing by Preston-pans, to the shore of Fife. Mr. Williams has recently given his observations on this subject, with much practical skill. The Lothians, and Fifeshire, particularly abound with this useful mineral, which also extends into Ayrshire; and near Irwin is found a curious variety, called ribbon coal. A singular coal, in veins of mineral, has been found at Castle Leod, in the east of Rosshire.

In passing to the less important minerals of Scotland, the new earth found at Strontian, in the district of Sunart, and parish of Ardnamurchan, Argyleshire, is now consecrated in numerous systems of mineralogy and chymistry. Ben Nevis affords beautiful granite. Fine statuary marble is found in Assynt, and at Blair Gowrie, in Perthshire. A black marble, fretted with white like lace-work, occurs near Fort William; dark brown with white at Cambuslang, Clydesdale. Jasper is found in various parts; Arthur's seat offers a curious variety, and on the western shore of Icolm-kill, are many curious pebbles, of various descriptions‡. Fullers' earth is found near Campbeltown, in Cantire; and, it is supposed, that there must be a vast mass of talc, equal to that of Muscovy, in the mountains which give rise to the river Findorn, as large pebbles of it are sometimes found in that stream. The pearls have been already mentioned: but that any of the gems are found in Scotland, seems dubious. Quartz and fluor assume various hues; and what are called false sapphires, rubies, emeralds, &c. fall under one or other of these descriptions, while the real gems belong to the argillaceous class, and when examined with a microscope, are found to consist of minute layers, a form common to the argillaceous description.

Mineral Waters. The mineral waters of Scotland are numerous, but none of equal fame with those of England. The chief are Moffat wells in the south, and those of Peterhead in the north.

* Min. vol. ii. 174.

† Nat Phil. Improven by new Exp. Edinb. 1683. Quarto, p. 258—302.

‡ Garnett's Tour.

NATURAL CURIOSITIES. Scotland, like other mountainous countries, abounds with singular scenes, and natural curiosities. The caves on the shore near Colvend, in Dumfriesshire, are worth notice; and the beautiful falls of the Clyde, near Lanark, have deservedly excited much attention. In proceeding up the river from Lanark, first occurs a small cataract, called Dundaff Linn, then that of Corra, the most picturesque; little more than half a mile further, that of Bonnington appears, a single cascade, of about twenty-seven feet. To the west of Lanark is found the cataract of Stone Byres, beyond which salmon cannot pass up the stream. On the east of this part of Scotland, are the pastoral vales of the Tweed and Teviot, celebrated in song; the deep pass of the Peaths; and the romantic rock of Bass, the haunt of the solan goose; and a well near Edinburgh abounds with petrol. The basaltic columns of Arthur's seat, deserve inspection. On the northern shore of the Forth, near Dysart, a coal mine has for ages been on fire, probably from decomposed pyrites, and has supplied Buchanan with a curious description. The beauties of Loch Lomond have been so often described, that it is unnecessary to repeat so trivial a theme; but the *Trosacs*, or singular hills around Lake Ketterin, &c. form a new acquisition to the traveller. The hill of Kinnoul near Perth, is a great curiosity, presenting a mass of uncommon minerals. The numerous lakes and mountains need not be again mentioned. The rocks off the coast of Aberdeenshire, often assume singular forms of arches and pillars, &c. and the space from Trouphead to Portsoy, abounds in uncommon rocks, and singular marine productions. The caves of Nigg, in Rosshire, may be worth visiting; and the more northern shores present innumerable wild scenes of savage nature. Near Lathron, in Caithness, is a large cave, into which the inhabitants sail to kill seals. Noss-head presents a singular quarry of slate, marked with various metallic figures. The isles Stroma, near the northern shore, preserve dead bodies for a long time without corruption*. It may, perhaps, be esteemed a natural curiosity, that the river of Thurso was so abundant in salmon, that 2500 have been caught in one morning. Near Tong is the cave Frasgill, about fifty feet high, and twenty wide, variegated with a thousand colours, which are lost in each other with a delicacy and softness that no art can imitate†. On the east of Durness, is the cave of Smo, within which is the resemblance of a gate, succeeded by a small lake of fresh water, containing trout; the extent of this subterraneous lake, has never been explored: and near Sandwit is said to be a small grove of hazels, about four inches high, bearing nuts. The singularity of the coast of Edrachills, south of Loch Inchard, has already been mentioned. But the verdant pastures of Farouthead and Cape Wrath, may well be esteemed a natural curiosity in that distant region, where the want of roads and bridges remains a disgrace to the country. The western coast of Rosshire does not seem to contain any object worth mentioning, and that district remains to be explored by the curious traveller. We only know the grand cataract of Kirkag river, and the cave of Gandeman, near Assynt point. The cascade of

* Bryce's Map, directed by Mac Laurin. † S. A. III. 519.

Glamma, in the heights of Glen Elchaig, is truly sublime, amidst the constant darkness of hills and woods. Ben Nevis will, of course, attract notice from its singular form and elevation. According to Mr. Williams*, it consists of one solid mass of red granite, which he traced at the base for four miles along the course of a rivulet on the east; the height of this mass he computes at 3600 feet, and above it are stratified rocks, the nature of which he does not explain; but, he says, that those on the summit are so hard and tough, that wrought iron falls short of them. The stupendous precipice, on the north-east side, exhibits almost an entire section of the mountain. In Argyleshire, the marine cataract of Loch Etif, the beautiful lake of Awe, and environs of Inverary present the chief objects of curiosity.

* Vol. ii. 63.

SCOTTISH ISLES.

SCOTTISH ISLES. THE Islands that belong to Scotland are numerous and important, and fall naturally into three grand divisions; the Hebudes*, or Western Islands; the Orkneys; and the islands of Shetland.

On passing the conic rock, called Ailsa, towards the north, two beautiful islands adorn the Frith of Clyde, those of Arran and Bute†.

ARRAN. The first is about twenty-three miles in length, by nine in breadth, and has 7000 inhabitants. The chief place is the village of Ranza; and Brodic castle is memorable in history. The exports are, black cattle and barley‡. Mr. Jameson has recently published an account of this island, particularly its mineralogy, from which it appears that it is a mountainous region: and Goatfell is near 3000 feet in height. The southern parts of the island present low and cultivated grounds; the base is chiefly sand-stone and granite, the former traversed by veins of basalt. Near Lamlash, is an extensive vein of pitch-stone, of a greenish colour, and the black also occurs. There is also granitine, composed of quartz, felspar, and hornblende; micaceous schistus likewise abounds; there is little coal.

BUTE. Bute is about twelve miles in length, by four in breadth; inhabitants about 4000; the chief town is Rothsay, and in the vicinity is Mount Stuart, the ornamented residence of the Marquis of Bute, and worthy of the distinguished taste of the noble proprietor.

HEBUDES. To the west of the Chersonese of Cantire, begin the Hebudes, or Western Islands, properly so called.

ILAY. The first is Ilay, about the same length as Arran, but nearly eighteen miles in breadth. Ilay produces many black cattle,

* This name was corrupted by Hector Boyce, into Hebrides, a name still retained by those who prefer the old mumpsimus to the new sumpsimus. Boyce was misled by an edition of Solinus, Venice, 1491, 4to. in which, among many errors of the press, Ebrides is put for Ebudes.

† Pennant's Voyage, 168. ‡ Statist. Account, vol. ix. p. 169.

which are exported, and sometimes pass as far as England*. But the sheep are rare; small horses are much used, as the country is not very mountainous. This isle belongs to Mr. Campbell of Shawfield. Inhabitants about 7000. Lead mines were here discovered in the sand-stone, in 1763; this lead is, as usual, mingled with silver. Copper has also been found, and there are appearances of emery, and even of plumbago. At Saneg-mor is an intricate cave.

JURA. Jura is divided from the last by a narrow sound: it is about twenty miles in length, but the breadth seldom more than five. It is one of the most rugged of the Hebudes, which, in general, are mountainous regions. The paps of Jura, a line of conic hills, present a singular appearance: they are on the western side of the island, and almost bare of vegetation†. The best crops are potatos and barley; and the isle contains abundance of peat. The cattle are small, but the sheep excellent. Minerals, iron ore and manganese; and there is a quarry of slate. The noted gulf or whirlpool of Brecan, or Corryvrekan, is on the northern extremity of Jura‡.

To the west of Jura are the isles of Oransa and Colonsa; and the strait between them being dry at low water, they may be considered as one island about ten miles in length. Soil generally light and arable, producing barley and potatos. The venerable ruins of the ancient monastery of the Canons regular, in Colonsa now exist no longer; but those of a curious priory in Oransa still remain ||.

MULL. The next isle of any consequence is that of Mull, one of the largest of the Hebudes, and surrounded with smaller interesting islands. Mull is about twenty-eight miles in length, by a medial breadth of about eighteen. An intelligent traveller informs us, that the population is about 7000**. The climate cloudy and rainy. Chief diet of the people, potatos or barley-meal, with a little fish; drink pure water, sometimes a little whiskey. Hovels constructed of whin; and the thatch guarded against the wind, with large stones, the smoke ascending by a hole in the roof. The ingenious author observes, that the Esquimaux, and Laplanders, prepare better residences. On the N. E. is the new village of Tobermory, which it is hoped will be prosperous. According to St. Fond, this island contains a large portion of basaltes; and the mountain of Ben More presents to his eye appearances of lava. On the north of Ashnacregs he discovered a curious wall of basalt, forming a kind of ancient circus. It is, indeed, not a little remarkable, that while the opposite shores of Argyle present the same red granite which here pervades Scotland, in a line from the N.W. to S. E. as already mentioned; yet Mull, which is directly in that line, seems to display no appearance of it, a circumstance which adds to the credibility, that in this neighbourhood may have been an ancient volcano, which deranged the course of nature. For though the volcanic system have been pushed by some French writers to ludicrous excess, yet, when we consider the numerous volcanoes existing in Kamschatka, and particularly along the Andes, in South America, by many believed to have been a continent of later formation than those of the other he-

* S. A. xi. 278. † S. A. xii. 316. ‡ Knox's View, ii. 451.
|| Stat. Acc. xii. 327. ** St. Fond, tome ii. p. 89.

misphere, it may seem mere prejudice, not to allow the existence of volcanoes, in certain instances; though fire be in general too potent an agent for the mild progress of nature, and, indeed, nearly accidental, while water is her grand and universal engine: but, on the other hand, when we reflect that basalt is strongly impregnated with iron, and that the basaltic columns are also found at Edinburgh, at Dichmont, Clydesdale, and in Skey, and extend over great part of the county of Antrim, we must allow a circle of about 600 miles for this eruption, far too vast for any volcano or volcanoes, and probably arising from the fermentation of iron in the interior of the globe. Mull stands in the centre of several small but interesting isles. On the east is Lismore, fertile in oats, bigg, or beer, often called by the vague name of barley, though it be a very distinct species from the English barley. This isle was anciently the chief seat of the bishops of Argyle, who were thence denominated bishops of Lismore, and some ruins of their residence remain: it was in consequence well replenished with deer, and fables have arisen that it was once a forest. To the south of Lismore occurs Kerrara, remarkable for the death of Alexander II, in 1249*. To the volcanist St. Fond†, Kerrara seems partly volcanic, as it produces basalt; but it has also slate, and a fibrous micaceous schistus, composed of quartz, steatite, and mica.

Icolm-kill. But the most curious objects in the vicinity of Mull, are Icolm-kill, and Staffa. Hyona, or Icolm-kill, is about three miles long, by one broad, and is venerable as the primitive seat of Scottish literature and religion, founded by St. Columba in the sixth century. Its history and ruins have been often described; but, it may be added, from a recent traveller, that the isle produces beautiful white marble, and large blocks of jasper, or rather indurated steatites‡. The sacred edifices are partly constructed of red granite, resembling the Egyptian, which forms Icolm-kill, and the Isle of Nuns adjacent, fragments of the great granitic chain, formerly mentioned. Some parts of the isle are said to present green and red jasper, elegantly veined, and some specimens of zeolite; in the bay of Martyrs, on the E. side is found hornblende; and in the small haven, on the opposite part of the isle, are immense numbers of beautiful pebbles, chiefly serpentine, jasper, granite, marble, lapis nephriticus, nephritic asbestos, violet coloured quartz, and porphyry. These pebbles are rounded, and finely polished by the tide, which rolls immense quantities of them backwards and forwards, with a noise like thunder||. In botany this isle produces the beautiful sea bugloss, and the sea holly; the Lapland willow, a scarce shrub, grows not far from the marble quarry: navel wort, marsh trefoil, and dwarf juniper, are also found.

Staffa. Staffa, about six miles to the north of Hyona, was first introduced to public notice by Sir Joseph Banks. Buchanan has mentioned the isle, but not its grand singularities, its beautiful basaltic columns, and one of the most surprising objects of nature, the vast

* Pennant, 357. † Tome ii. 170.

‡ Garnett, i. 266, corrected by Jameson, in his Mineralogy, and by the ocular observations of a friend.

|| Garnett, ib.

basaltic cavern, called Au-ua-vine, or the harmonious grotto, a name now connected, as every thing is, with Fingal; but which may arise, either from a melodious sound, produced by the percussion of the waves at the furthest extremity, or from the exact order in which the columns are disposed*. Height of the entrance fifty-six feet, breadth thirty-five, thickness of the exterior vault twenty. The depth, or length of the cavern is no less than 140 feet; and when St. Fond has represented the exterior light as penetrating the whole, he has committed a great error in perspective.

TIREY. To the N. W. of Mull, are the isles of Tirey and Col, the former producing a most beautiful marble, of a rose-colour, penetrated with small irregular crystals of green hornblende, and which the French naturalists have, from the name of the isle, called Tirite, no similar marble being any where found. Tirey is generally plain and fertile. Col, on the contrary, is rocky, but has several small lakes replenished with fish. Dr. Johnson has paid a deserved tribute to its lord†.

SKEY. Another group consists of Skey, in the Scandinavian styled Skua, and the surrounding isles. Skey is the largest of the Hebudes, being about forty-five English miles in length, and about twenty-two in breadth. Inhabitants about 15,000; chief exports black cattle and small horses: the land, as usual in the Hebudes, rough and hilly. Muggastot is the residence of the Lord Macdonald, Dunvegan that of Mr. Macleod. At Struan is a Danish fort, sixty feet diameter, and eighteen high‡. A high hill, near Talyskir, presents a series of basaltic columns, the most northern of this class: pillars pentagonal, and about twenty feet high||. Dr. Johnson, and his attendant Mr. Boswell, have well described the state of life and manners in Skey. The houses are chiefly turf, covered with grass. The face of the country wild, heathy, and deluged with continual rains. To the south of Skey are the isles of Rhum and Eig: the first still produces red deer, an animal now rare in the isles: and in Eig is a curious cave, with forty skeletons, remains of the people here slain by a Macleod. To the N. E. of Skey are Raza and Scalpa; the harbour of Port Ree is protected by the former isle, and has a village of the same name, the only one in the country. The other isles in this groupe offer little memorable. Canna and Eig contain basaltic pillars, and in the former is Compass Hill, which strongly affects the needle.

It now remains to give some idea of the exterior chain of the Western Isles, forming, as it were, a barrier against the Atlantic. Two small and remote isles have attracted considerable notice.

RONA. The first is that of Rona, about twelve leagues to the N. W. of Cape Wrath, and about thirty leagues W. from the Orkneys. This little isle, with its companion Suliska, or Bara, has almost escaped from the Scottish maps, being little known and rarely visited. In the last century, Sir George M'Kenzie, of Tarbat, afterwards Earl

* St. Fond, tome ii. p. 59. † Journey, p. 295. ‡ Pennant, pl. 36.

|| On the opposite side of the isle, near Port Ree, is another basaltic rock, of great height. Stat. Acc. xvi. 140. In Port Ree parish is a large cave, full of curious stalactites. Ib. 147.

of Cromarty, drew up a short account of Rona, from the oral information of inhabitants, at that time consisting only of five families*. As the isle could only support thirty inhabitants, any supernumeraries were sent to Leuis, to their lord, the earl of Seaforth, to whom they paid yearly a small tribute of meal and feathers. Drift timber supplied their only fuel: he adds, that the wool of their sheep was bluish, and ascribes the same colour to those of Hirta, or St. Kilda.

HIRTA. The small isle of Hirta, or St. Kilda, must have attracted much notice, even in Lesley's time, for in his map he has represented it as about six times the size of Skey, while in truth it is only two miles and a half long, by one mile in breadth. St. Kilda is about twelve leagues to the west of North Vist; and has been repeatedly described, the singular manners of its inhabitants having excited considerable attention, and for a minute account, the reader must be referred to Martin and Macauley. Sheep abound here, and in the little isles adjacent, probably of the same kind with those of Shetland; but the late accounts say nothing of the colour, and only speak of the fecundity.

LEUIS. Having thus briefly mentioned these remote and little visited isles, the plan here followed must be resumed by some account of Leuis, the principal island of the Western chain. It is about fifty miles in length, by twenty in breadth. The face of the country consists of a heathy elevated ridge full of morasses S. W. to N. E.; but near the shores are several verdant vales capable of cultivation. The Harris, or south end of this isle, is still more mountainous, and presents what is called a forest, because some deer are there found. James VI attempted to introduce industry into the Hebudes by planting a Dutch colony at Stornaway in Leuis; but it was soon extirpated by the inhabitants†. Stornaway is however now a considerable and flourishing town, with an excellent harbour; the view from which, far to the east, presents the rugged mountains of Sutherland and Ross; and near it is the seat of the Earls of Seaforth, formerly proprietors of the island‡. Besides cottages, there are about seventy houses covered with slate. The seasons in Leuis are oppressed with rain, as usual in the Western Highlands and isles; but there is a considerable fishery. The crops are oats, bigg, and potatos; no trees will thrive except alder, and mountain ash; and hardly a shrub appears: but there are many black cattle and sheep; nor is there any want of small horses. But the chief resource of Leuis must be the fishery, till industry shall have found the means of draining the upland marshes, and spreading an exuberance of lime as manure. At Classernes is a

* Monro's Descript. of the W. Isles, in 1549. Edin. 1774. Duodecimo, p. 63. The Stat. Acc. xix. 271, adds nothing.

† Mr. Marshall, in his Travels in Holland, &c. vol. i. p. 175, observes that, in the opinion of the Dutch, the only mean of establishing a fishery in the west of Scotland, would be to build a city, and make it the seat of the whole undertaking, as he there explains at length. But such a city would be far better situated on the western coast of Scotland, as the example of Stornaway proves. There is no town between Campbeltown and Thurso, a space of 300 miles, though there seems to have been one on Loch Tong. Knox, ii. 473.

‡ Statist. Acc. xix. 241.

remarkable judicial circle, consisting of an avenue of thirty-nine stones about seven feet high, closing in a circle of twelve stones with one in the centre thirteen feet in height.

North Vist. To the south of Leuis is North Vist, about twenty-two miles in length from E. to W. and about seventeen in breadth N. to S., for recent discoveries have restored this isle to its proper form, among many other improvements which have taken place within these few years in Scottish geography. The face of the country corresponds in general with that of Leuis; and trees are equally unknown. Potatos are generally cultivated. Westerly winds, with rain or fog, usurp two-thirds of the year. Lord Macdonald is the proprietor*.

South Vist. The small isle of Benbecula, and some others, lie betwixt North and South Vist; the latter is about twenty-three miles in length N. to S. by about ten in breadth W. to E. The morassy central chain extends also through this isle; but to the east are dry hills covered with heath and verdure. The productions also resemble those of Leuis; and there are many small lakes full of excellent trout. Chief exports black cattle and kelp. This isle is also naked of wood.

Orkneys. The islands of Orkney and Shetland remain to be described. The Orkneys form a numerous groupe, around the Main Land, or what, by some new and fabulous term, is called Pomona†. The Main Land is about twenty-five miles in length E. to W., by about thirteen in breadth N. to S. Kirkwall, the chief town of the Orkneys, contains about three hundred houses; and has a stately cathedral dedicated to St. Magnus, length 226 feet, height of the roof 71, of the steeple 133. It is built of free-stone, and by the good sense and taste of the Orcadians is preserved more entire than even the cathedral at Glasgow‡. Opposite stands the bishop's palace, now called a castle. The chief exports of Kirkwall are beef, pork, butter, tallow, hides, calf skins, rabbit skins, salted fish, oil, feathers, linen yarn, and coarse linen cloth, kelp‖, and in fruitful years, corn. The chief imports are wood, flax, coal, sugar, spirits, wines, tobacco, and snuff, flour and biscuit, soap, leather, hardwares, broad cloth, printed linens and cottons. In 1790 the exports were valued at 26,598*l.*; and the imports at 20,803*l.* Manufactures are linen yarn, and coarse linens, and kelp: this last was introduced about sixty years ago, and has been since diffused over the Highlands and isles. In most parts of the Main Land the soil is good, though shallow, with a calcareous bottom. The horses are small but spirited; and the cows, though also small, yield excellent milk. The sheep in the islands of Orkney are computed at 50,000. Swine also abound of a dirty white colour, and diminutive size. The numbers of sea fowl may be easily imagined. The

* Statist. Account, xiii. 300.

† The old accounts are Wallace's 1693, and Brand's 1701; the modern, the Statistic Survey.

‡ Stat. Acc. vii. 531.

‖ Sanda produces great quantities of kelp; when the Orkney's in general may yield 2,500 tons, 500 and 600 are drawn from that Isle only. S. A. vii. 455.

Norse language has yielded to the English, and the manners of the people are singularly civilized for so remote a region. The Main Land contains several of those edifices called Piks houses, and on its western side at Yestnaby, near the house of Skeil is a singular natural pavement, consisting of stones figured in various forms, resting on a bed of red clay reclining on a high rock: the length of this singular pavement is about a quarter of a mile, breadth about twenty feet*. The Ward Hill of Hoy, the highest in this region, (1620 feet,) stands in the island of the same name, the S. E. promontory of which is erroneously called Walls in the English maps, instead of the native name Waes: near its bottom is the noted dwarfy stone, about thirty-four feet long by seventeen broad, and eight high, hollowed out by art, probably for the residence of some hermit.

The inhabited islands of Orkney are computed at twenty-six, and the people at twenty-three thousand and fifty-three*; the bases are chiefly sand-stone, and sand-stone breccia, as appears from Mr. Jameson's recent Mineralogy of the Scottish Isles. Iron is found, and perhaps some lead; but the mention of silver and tin seems fabulous. Hazles are seen, and sometimes willow, and some ash trees; thorn bushes, and plum trees, still exist in the Bishop's garden. But in the morasses, trunks of ancient trees are found, sometimes thirty feet in length. It is suprising that in the present progress of every art, numerous experiments have not been made to discover some tall tree, which can endure the spray of the ocean; for if a fence of such were first reared, many other kinds might flourish under its protection. The mountain ash, or the birch, which in Lapland is the last offspring of expiring vegetation, may perhaps be found to answer this description.

SHETLAND. The islands of Shetland present another groupe similar to those of Orkney; with a Main Land or chief island in its centre. The Main Land is much intersected by the sea: and is about fifty-seven miles in length, by about ten or twelve miles of medial breadth‡. The other isles are generally small, yet twenty-six are said to be inhabited. "On viewing these islands in general, a wonderful scene of rugged, bleak, and barren rocks presents itself to our view. No tree or shrub is to be seen, to relieve the eye in wandering over these dreary scenes. Sometimes however a few scanty portions of cultivated ground catch the eye of the traveller, exciting emotions of pleasure, and forming a striking contrast to the barren heath-covered mountains, which skirt them. The western part presents many scenes as wild and sterile as can well be conceived; grey rocks rising from

* Wallace, p. 24. Brand, p. 43. † S. A. xx. 612.

‡ We have better charts of the coasts of New Holland, than of the isles of Orkney and Shetland. Captain Donnelly's chart of the Shetland isles, seems the most accurate, in which the Main Land corresponds in length with Leuis, while Ainsley's would give a length of almost ninety miles. Yell and Unst, seem also more properly disposed in Captain Donnelly's map. The Danish captain Von Lowenorn (Zach's Geographical Journal, May 1799) found that the Shetland isles were about one-third shorter than represented in the English map (Preston's); which also puts the northern extremity half a degree further north, than it was found by minute observations. Lowenorn published a map of these isles, in 1787.

the midst of marshes or pools, and shores bounded by awful sea-beat precipices, do not fail to raise in the mind, ideas of desolation and danger.

"The coasts are in general rugged and precipitous, presenting, in many places, scenes truly grand and magnificent; vast rocks of various heights, dreadfully rugged and broken, opposing their rude fronts to all the fury of a tempestuous ocean; which in some places has formed great detached pillars, in others has excavated grand natural arches and caverns that mock all human magnificence; and strike the beholder with that awe and wonder, which must affect every one on viewing these amazing wrecks of nature*."

Such is the animated description of a late writer; who adds, that the east side of the Main Land, and other isles, is comparatively low, but the west lofty and rugged. This is well known to be the case with most mountains and islands, because the winds and tempests from the west have more power than those from the opposite quarter. The hills in the Main Land run in three ridges from N. to S.; they are generally round and of little height. Ronas, the highest, stands detached in the N. W. corner of the Main Land; and is about 1500 feet above the level of the sea. When the same writer attempts to establish that all chains of mountains run according to the length of the country, he espouses a mere theory in opposition to stubborn facts. The mountains of North America, the Uralian and some other chains in Siberia; the transverse chain through the centre of Africa E. to W. all establish the contrary position. In Europe the mountains of Spain, the Alps, the Carpathian mountains; and, not to crowd examples, those of Ireland, Scotland, and even of England, have no connection with the length of the country, nor can a stronger proof be produced of the boldness of theory than thus to remove even mountains from their seats; which proceed in every direction, bend and terminate without any visible cause, and have seldom any connection with the form of a country, as the destructive powers of nature external and internal assail mountains even more than plains.

The hills in Shetland are chiefly composed of sand-stone, breccia, &c. The basis seems gneiss, and micaceous schistus, which are sometimes exposed to the air. Limestone is also found and some granite; but on the whole the mass is arenaceous. A kind of brown wacken is found in Papa Stour; where may also be traced steatite, calcedony, red jasper, and fluate of lime. In Unst, the most northern of these isles, appear hills of serpentine, containing actinote, labrador hornblende, tremolite, and talc: and the Shaw, the most northern point of this isle, and of the British dominions, consists chiefly of gneiss. Unst also produces iron-stone, jasper or rather serpentine, pure rock crystals, and garnets of an elegant form. This remote isle supplies black oats, bigg, potatos, cabbages, and various garden roots and plants, particularly delicate artichokes†. In general the granite, and micaceous schistus, appear furthest to the north and west. Sappare is found in the S. W. cliffs of the Main Land; and it is said there are appearances of copper

* Jameson's Min. p. 2, 3. 8vo.
† Stat. Acc. v. 185.

in the same quarter. It was in the form of pyrites, and was worked for some time, till the vein gradually decreased and was abandoned*. What is called the bog ore of iron seems to abound in Fetlar, and of excellent quality†.

The climate of the Shetland Isles is variable, and disturbed with rains and thick fogs. The frosts are seldom severe, and snow rarely continues long on the ground. The inhabitants are indeed sufficiently wretched, without additional evils; and a benevolent government ought to pay a particular attention to those distant prisoners. The coruscations of the Aurora Borealis illuminate the long gloom of winter, and delight the inhabitants, who call them *merry dancers*. The arable land is mostly near the coast, and produces a coarse kind of oats and bigg. Potatos have lately formed an addition of singular advantage; but turnips, parsnips, and carrots, are confined to the gardens of gentlemen. The chief food of the inhabitants consists of fish, and various kinds of sea fowl, which cover the rocks: the captors of the last shew singular skill and intrepidity, and often meet with a violent fate amidst the stupendous precipices. The cattle rather larger than those of Orkney, and the butter excellent if properly prepared. Sheep are not uncommon, and have been recently praised for the fineness of the fleece. The horses have mettle and beauty, and on account of the singular minuteness of their size have become objects of luxury and curiosity in England. The swine are small, and little propagated, because they injure the pastures; an evil easily obviated by the simple practice of putting a ring through the nose.

LERWICK. Lerwick, the chief town or rather village, stands on an excellent harbour called Brassa Sound, formed by the little isle of Brassa on the east of the Main Land, and formerly greatly fre-

* Jameson, p. 21.

† S. A, xiii. 283. From Mr. Jameson's Mineralogy of the Scottish Isles, (2 vols. 4to.) it appears that Ailsa consists chiefly of mingled hornblende and felspar: Arran of reddish sand-stone, like Shetland, with veins of basalt and pitch-stone; but Goatfell presents micaceous schistus and granite, with yellow crystals, or mock topazes, commonly sold as Cairngorm stones. Bute, similar. Ilay, limestone, with granular quartz. Jura, granular quartz, with veins of basalt: this granular quartz is by Kirwan called arenaceous quartz, or primitive siliceous sand-stone. Seil, slate; Lismore, limestone, with basalt. Mull has much basalt, with sand-stone, limestone, &c. in the S. W. beautiful granite. Icolm-kill, mostly granite, and hornblende rock, with one quarry of marble. Coll, gneiss, with granite. Tirey, hornblende rock, gneiss, and basalt, with a quarry of beautiful marble. Eig, basalt, with limestone, &c. Rhum, red sand-stone, with veins of basalt; mountains, hornblende, and felspar. Canna basaltic; that at Compass-hill affects the needle. Skey, basalt, with hornblende, limestone, &c. Rasa, sand-stone, and beautiful porphyry, with a blue basis.

The exterior chain of the Western Isles, was not visited by Mr. Jameson; but Lewis seems to abound in lime-stone, while Bernéra is said to consist of amianthus.

The Orkneys consist almost entirely of sand-stone, massy and schistose: at Skeil, on the W. of the Main Land, the sand-stone, which looks rusty, as if slightly impregnated with iron, is worn (as already mentioned) into many singular forms, by the action of the weather, a circumstance which has greatly impressed the old describers of the Orkneys. A few miles around Stromness are granite, gneiss, micaceous schistus, and hornblende.

quented by the Dutch fishers. Lerwick is an irregular village, perched on rocks; and contains about one hundred and fifty families. Near it is one of those rude edifices called Piks houses; and several others appear in the isles of Shetland, particularly in Fetlar: there is also a rock abounding with iron ore which affects the compass.

The herrings appear off Shetland in vast columns, in the month of June, altering the very appearance of the ocean, which ripples like a current. These columns have been computed to extend five or six miles in length by three or four in breadth, and in bright weather reflect a variety of splendid colours. They afterwards divide to the E. and W. of Great Britain, furnishing a providential supply of food to many barren districts. The chief exports of Shetland are fish of various kinds, chiefly herrings, cod, ling, and torsk, or tusk. The inhabitants of the Shetland islands in 1798 were computed at twenty thousand one hundred and eighty-six*, more than the country can well support, especially in the present deficiency of intercourse with the Dutch. They have of late become addicted to the use of tea and spiritous liquors, which will infallibly contribute to lessen the population. In this distant region there are neither roads nor bridges, which may be pronounced the first steps in any country towards the progress of industry. The same deficieney occurs in the Orkneys, and even in the northern extremity of Scotland; where, however, a road has been recently opened between Ullapool and Dornoch. The Swiss form roads even in the Alps; and certainly the Scottish Highlands do not offer more insuperable barriers to this most essential of all improvements.

* Stat. Acc. xx. 612.

IRELAND.

CHAPTER I.

NAMES.—EXTENT.—ORIGINAL POPULATION.—PROGRESSIVE GEOGRAPHY.—HISTORICAL EPOCHS.—ANTIQUITIES.

NAMES. THE large and fertile island of Ireland, being situated to the west of Great Britain, was probably discovered by the Phœnicians as early as the sister island. On the first dawn of history, and when the north-west of Europe was as obscure to the Greeks, as the islands on the north-east of Siberia were recently to us, it would seem that Ireland constituted one of the Cassiterides. The poems ascribed to Orpheus deserve no credit, but it appears that the island was known to the Greeks by the name of Juverna, about two centuries before the birth of Christ. When Cæsar made his expedition into Britain, he describes Hibernia as being about half the size of the island which he had explored; and while the Romans maintained their conquests in the latter region, Ireland continued of course to be well known to them, and Ptolemy has given a map of the island which is superior in accuracy to that which represents Scotland. Towards the decline of the Western Empire, as the country had become more and more known, and had been peopled with various tribes, the Romans discovered that the ruling people in Ireland were the Scoti; and thenceforth the country began to be termed Scotia, an appellation retained by the monastic writers till the eleventh century, when the name Scotia having passed to modern Scotland, the ancient name of Hibernia began to reassume its honours. It is supposed that this name, and the Gothic denomination Ireland, are mere modifications of the native term Erin, implying the country of the west.

EXTENT. The extent of this noble island is about 300 miles in length, and about 160 at the greatest breadth. The contents in

square miles may be computed at 27,457*; and the population being about three millions, there will be about 114 inhabitants to each square mile.

ORIGINAL POPULATION. It is probable that the original population of Ireland passed from Gaul, and was afterwards increased by their brethren the Guydil from England. About the time that the Belgæ seized on the south of England, it appears that kindred Gothic tribes passed to the south of Ireland. These are the Firbolg of the Irish traditions; and appear to have been the same people whom the Romans denominated Scoti, after they had emerged to their notice by not only extending their conquests to the north and east in Ireland, but had begun to make maritime excursions against the Roman provinces in Britain. But Ireland has been so much crowded with Celtic tribes, expelled from the continent and Britain, by the progress of the German Goths, that the Belgæ almost lost their native speech and distinct character; and from intermarriages, &c. became little distinguishable from the original population except by superior ferocity, for which the Scoti, or those who affected a descent from the Gothic colonies were remarkable; while the original Gael seem to have been an innocuous people.

PROGRESSIVE GEOGRAPHY. The map of Ireland by Ptolemy, above-mentioned, is the first geographical document of the island. The general shape, rivers, and promontories, are delineated with as much accuracy as could have been expected. Nay as we advance into the middle ages, the geography of Ireland becomes more obscure. The chief tribes mentioned by Ptolemy are the Darni upon the north-east, the Venicni and Robogdii on the north-west. Beneath them are the Nagnati, Auteri, and Gangani, on the west; the Erdini in the centre; and the Voluntii, Eblani, and Cauci, on the east; succeeded by the southern tribes of the Menapii, Brigantes, Vodii, Ivelni, Velabri, and Luceni. Ptolemy also mentions ten towns; of which the chief is Eblana now Dublin. In the middle ages we find the Dalriadi on the north-east; and the Crutheni on the north-west. The large tribe of Nelli occupy much of the centre. The Voluntii seem transformed into the people of Ullagh; the Erdini of Ptolemy yield the name to Argialla; and the Nagnati to Maigh Nais. The Gangani of Ptolemy seem the Galeng of the middle ages; the Menapii, &c. must be traced in Muman, or present Munster. The towns mentioned by Ptolemy might also be traced with some degree of accuracy.

The ravages of the Danes, in the ninth and following centuries, cannot be supposed to throw much light on the progressive geography of Ireland: but the settlements of the English under Henry II certainly contributed to that end, for Giraldus Cambrensis at that period composed his description of Ireland, which amidst numerous fables contains some curious facts: and the geography of Ireland was little better known till the reign of Elizabeth, when Stanihurst published his description, which was soon followed by that of Spenser the poet. The most remarkable distinction introduced by the new invaders into

* Beaufort, p. 14, says 30,370 English miles.

Ireland was that of the English Pale, or circuit of a few counties around Dublin, within which the English language was chiefly spoken. So inconsiderable indeed were the English possessions in Ireland, that the monarchs only assumed the style of Lords of Ireland, till the reign of Henry VIII, when king of Ireland became a part of the sovereign's style. Nor was Ireland completely subjugated till the reign of the first James, who adds this merit to that of founding the American colonies; but mankind will ever be infatuated by the triumphs of war, and prefer a meteor to the pure light of a pacific reign.

Historical Epochs. The first historical epoch of Ireland is its original population by the Celtic Gauls, and the subsequent colonization by the Belgæ.

2. The maritime excursions of the Scoti against the Roman provinces in Britain.

3. The conversion of Ireland to Christianity in the fifth century, which was followed by a singular effect; for while the mass of the people retained all the ferocity of savage manners, the monasteries produced many men of such piety and learning, that Scotia or Ireland became celebrated all over Christendom.

4. This lustre was diminished by the ravages of the Scandinavians, which began with the ninth century, and can hardly be said to have ceased when the English settlement commenced. The island had been split into numerous principalities, or kingdoms as they were styled; and though a Chief Monarch was acknowledged, yet his power was seldom efficient, and the constant dissentions of so many small tribes rendered the island an easy prey.

5. In the year 1170, Henry II permitted Richard Strongbow Earl of Pembroke to effect a settlement in Ireland, which laid the foundation of the English possessions in that country. There are however coins of Canute king of England, struck at Dublin, perhaps in acknowledgment of his power by the Danish settlers.

6. Ireland began to produce some manufactures about the fourteenth century, and her sayes or thin woolen cloths were exported to Italy. It is probable that these were produced by the Bristolian colony, which had passed to Dublin, as mentioned in the description of England.

7. Richard II king of England attempted in person the conquest of Ireland, but being imprudent and ill served, nothing of moment was effected. The subsequent attempts of the English monarchs to accomplish this purpose need not be enumerated.

8. In the reign of James I, Ireland became entirely subjugated; and colonies of English and Scotch were established in the North.

9. The chief mean of the assimilation of the countries having been completely neglected, namely, the universal institution of parochial schools, for the education of children in the protestant religion and English language, the Irish continued a distinct people; and being instigated by their fanatic priests executed their dreadful massacre of the English settlers in 1641. This insurrection was not totally crushed till Cromwell led his veterans into Ireland.

10. The appearance of James II in Ireland to reclaim his crown, may also deserve a place.

11. The amazing progress of Ireland in manufactures and commerce, within these two years, may be classed as the most illustrious of its historical epochs.

12. The deplorable events which have recently happened in Ireland, have led the way to its union with Great Britain, a measure which it is eagerly to be hoped will be productive of great reciprocal advantages.

ANTIQUITIES. Upon a review of the more ancient of these historical epochs, and of the monuments which may be considered as belonging to each, it must be considered that the edifices having been constructed of wood till the eleventh or twelfth century, it cannot be expected that any remains of them should exist. Stone was chiefly employed in the construction of funeral erections of various kinds; nor are barrows wanting in Ireland, being hillocks of earth, thrown up in commemoration of the illustrious dead. Other monuments commonly styled Druidic may also be found in Ireland; such as single stones erect, circular temples or rather places of judgment, and the like, which may more properly be ascribed to the Belgic colony *.

The conversion of Ireland to Christianity was followed by the erection of a vast number of churches and monasteries, the latter being computed to exceed one thousand in number; but all these edifices were originally small, and constructed of interwoven withes, or hewn wood; for St. Bernard, in the twelfth century, mentions a stone church as a singular novelty in Ireland.

But the Scandinavian chiefs must before this period have introduced the use of stone into the castles, necessary for their own defence against a nation whom they oppressed; and sometimes even subterraneous retreats were deemed expedient, of which Ware and others have engraved specimens. To the Scandinavian period also belong what are called the Danes Raths, or circular intrenchments; and some chapels, such as those of Glendaloch, Portaferry, Killaloe, Saul Abbey, St. Doulach, and Cashel, is we may judge from the singularity of the ornaments, which however only afford vague conjecture. But of the round-castles, called Duns in Scotland, and of the obelisks engraven with figures or ornaments, few or none exist in Ireland. Under the Scandinavians the Irish coinage first dawns.

Of the eleventh and twelfth centuries many monuments, castellated or religious, may probably exist in Ireland Brian Boro, king of Munster, having been declared sovereign of Ireland in the year 1002, he distinguished himself by his virtues and courage; and Dermid III A. D. 1041.....1073 was also an excellent and powerful prince. Under these monarchs and their successors, Tirdelvac and Moriertac, the power of the Ostmen or Scandinavians was considerably weakened. The native chiefs had been taught the necessity of fortresses, and were generally devoutly attached to religion; it is therefore to be inferred that many castles, churches, and monasteries now began to be partly constructed in stone by architects invited from France and England; but perhaps the round towers were erected by native builders.

* See Ledwich's Introduction to Grose's Antiquities of Ireland, for Cromlechs in the county of Carlow, and a cave in Meath.

The castles, churches, and monasteries, erected since the period of the English settlement might be counted by hundreds; and for them one general reference may be made to the works of Ledwich and Grose: yet it is to be regretted that in collections of that kind the edifices are not arranged in the chronological order, as nearly as can be judged, of their erection. Among smaller relics of antiquity, the golden trinkets found in a bog near Cullen, in the south, deserve mention: as gold was found in Gaul, they are perhaps ornaments of the ancient chiefs brought from that region.

CHAPTER II.

POLITICAL GEOGRAPHY.

RELIGION.—ECCLESIASTICAL GEOGRAPHY.—GOVERNMENT.—POPULATION.—ARMY.—NAVY.—REVENUES.—POLITICAL IMPORTANCE AND RELATIONS.

RELIGION. THE legal religion of Ireland is that of the church of England; but it is computed that two-thirds of the people are Catholics; and of the remaining third the Presbyterians are supposed to constitute one half. The prevalence of the catholic religion is chiefly owing, as has already been hinted, to a neglect of education.

ECCLESIASTIC GEOGRAPHY. The ecclesiastic geography of Ireland comprizes four Archbishopricks, in themselves an evidence of the great number of churches formerly existing; and eighteen bishopricks.

Under the Archbishop of Armagh are the Bishops of	Meath Kilmore and Ardagh Dromore Clogher Raphoe Down and Connor Derry.
Under the Archbishop of Dublin	Kildare Ferns and Laughlin Ossory.
Under the Archbishop of Cashel	Waterford and Lismore Limerick Killaloe Cork and Ross Cloyne.
Under the Archbishop of Tuam	Elphin Cloyne Killala and Achonry *.

The catholics have also a hierarchy nearly similar, but the metropolitans and bishops are considered by the protestants as merely titular.

* Gough's Camden iii. 487. The Primacy is worth 8000*l.* a year; Derry 7000; the other bishopricks from 4000 to 2000. Young, ii. 189.

The Presbyterians being here dissenters, their form of ecclesiastic government necessarily approaches that of the independents.

GOVERNMENT. The Government of Ireland was constructed upon the plan of that of England, being vested in a house of commons, and another of peers, while the king was represented by a lord lieutenant or viceroy. But no act of importance was considered as valid, till it received the sanction of the king and council of Great Britain. At present, Ireland being united to England, the form of government is of course identically the same. There are some minute variations between the statute and common law of Ireland and those of England.

POPULATION. The population of Ireland has by some writers been recently swelled to the amount of four millions; but the most authentic documents seem to restrict the number to about three millions. Numerous emigrations have taken place from Ireland to the various British settlements; but no separate colony of Irish has been founded.

ARMY. Besides large contributions to the British army, Ireland in 1780 raised upwards of 40,000 volunteers, and has recently equipped a considerable militia and yeomanry. If we suppose every eighth person capable of arms, Ireland might raise a force of more than 300,000 men. Of mariners Ireland contributes an inadequate proportion, and inferior in skill to the British.

REVENUES. The public revenues of Ireland were computed by an intelligent traveller* at about one million sterling: or 6*s*. 8*d*. a head, when those of England stood at 1*l*. 9*s*.

POLITICAL IMPORTANCE AND RELATIONS. With regard to the political importance and relations of Ireland, they would undoubtedly be great; but their weight has fortunately never been felt apart from those of England. The confused system of the old native government almost prevented Ireland from being considered in the scale of European states; and since the introduction of a more civilized scheme, she has been indissolubly attached to England. Montesquieu has justly regarded it as a radical error in the politics of Louis XIV, that when he sent troops to Ireland to restore James II, he did not seize the opportunity of establishing a firm conquest of the island, which would eventually have proved of more solid advantage to France than all their idle plans of ambition, if they had even been realized. The great mass of the people of Ireland being catholics, one of the strictest bonds which can unite nations was already formed; and the numerous ports of Ireland might, under the conduct and ingenuity of the French, have sent forth numerous fleets, and have assisted their ally to balance the naval power of England. But happily for Great Britain that opportunity was for ever lost. After the great preponderancy which the British have now held at sea, for more than a century, it is inconceivable that Ireland, an adjacent island, could have remained a separate state, without the special and previous consent of England. Her commerce would have been totally at the command of her rival, and any rising fleet of war would have been crushed in the very bud. If the English armies could have been withstood, still Ireland must have been restricted to her native produce, and the most

* Young's Tour in Ireland.

innocent foreign luxuries must have been totally interdicted; nor to a candid and impartial observer would it appear that Ireland could attain any solid advantages by this *impossible* independence. Suppose an alliance formed with France, it must at least for a long time have continued an alliance of dependence; and to those who consult the real business of states, and not learned theories, which are very foreign from business, it must occur that this pretended alliance must soon have terminated either in the subjugation of Ireland by France, or a return to the connection with England, which would have been facilitated by an English party which would naturally exist in great force, and be continually increased by those who were malecontent at the French interpositions and usurpations. The political importance and relations of Ireland are therefore intimately blended with those of England; while the western position of the former imparts singular advantages in the commerce with America and the West Indies.

CHAPTER III.

CIVIL GEOGRAPHY.

MANNERS AND CUSTOMS.—LANGUAGE.—LITERATURE.—EDUCATION.—UNIVERSITIES.—CITIES AND TOWNS.—EDIFICES.—INLAND NAVIGATION—MANUFACTURES AND COMMERCE.

MANNERS AND CUSTOMS. SPENSER the poet, in his view of the state of Ireland, has preserved several curious particulars concerning the national manners in the reign of Elizabeth. As that work, though sanctioned by an illustrious name, is little read, two specimens shall be transcribed, one concerning what were then termed the Irish horse-boys; and the other giving some account of the bards. After describing the savage manners of the Gallo-glasses or infantry, and the Kernes or predatory cavalry, the venerable writer thus proceeds:

"And now next after the Irish kerns, methinks the Irish horse-boys would come well in order; the use of which though necessity (as times now be) do enforce, yet in the thorough reformation of that realm they should be cut off. For the cause why they are now to be permitted, is want of convenient inns for lodging of travellers on horseback, and of ostlers to tend their horses by the way. But when things shall be reduced to a better pass, this needeth especially to be reformed. For out of the frie of these rake-hell horse-boys, growing up in knavery and villany, are their kern continually supplied and maintained. For having been once brought up an idle horse-boy, he will never after fall to labour, but is only made fit for the halter. And these also (the which is one foul oversight) are for the most part bred up amongst the Englishmen; of whom learning to shoot in a piece, and being made acquainted with all the trades of the English, they are afterwards when they become kern, made more fit to cut their throats. Next to this there is another much like, but much more lewd and dishonest, and that is of their Carrows, which is a kind of people that wander up and down to gentlemens' houses, living only upon cards and dice; the which though they have little or nothing of their own, yet will they play for much money; which if they win, they waste most lightly; and if they lose they pay as slenderly, but make recompence with one stealth or another; whose only hurt is not that they themselves are idle lossels, but that through gaming they draw others to like lewdness and idleness. And to these may be added another sort of like loose fellows, which do pass up and down amongst gentlemen, by the name of jesters, but are (indeed) notable rogues,

and partakers not only of many stealths, by setting forth other men's goods to be stolen, but also privy to many traiterous practices, and common carriers of news."

After delineating the dissolute life of an Irish chieftain, Spenser thus introduces the Bards:

"In which if he shall find any to praise him, and to give him encouragement, as those Bardes and Rithmers do, for little reward or a share of a stolen cow; then waxeth he most insolent, and half mad with the love of himself, and his own lewd deeds. And as for words to set forth such lewdness it is not hard for them to give a goodly and painted shew thereunto, borrowed even from the praises which are proper to virtue itself. As of a most notorious thief and wicked outlaw, which had lived all his life time of spoils and robberies, one of their Bardes in his praise will say, that he was none of the idle milksops that was brought up by the fire side, but that most of his days he spent in arms and valiant enterprises; that he did never eat his meat before he had won it with his sword; that he lay not all night slugging in a cabin under his mantle, but used commonly to keep others waking to defend their lives, and did light his candle at the flames of their houses to lead him in the darkness; that the day was his night, and the night his day; that he loved not to be long wooing of wenches to yield to him, but where he came he took perforce the spoil of other men's love, and left but lamentation to their lovers; that his music was not the harps, nor lays of love, but the cries of people, and clashing of armour; and finally that he died not bewailed of many, but made many wail when he died that dearly bought his death".

Spenser, an excellent judge, then observes that he had caused several compositions of the bards to be translated, "and surely they savoured of sweet wit, and good invention, but skilled not of the goodly ornament of poetry; yet were they sprinkled with some pretty flowers of their natural device, which gave good grace and comeliness unto them; the which it is great pity to see so abused to the graceing of wickedness and vice, which with good usage would serve to adorn and beautify virtue."

The manners of the superior classes of people in Ireland now nearly approach to the English standard, except that excess in wine, unfashionable in England, continues to prevail too much in the sister island. The Irish gentry are also seldom addicted to literature or the arts; but amuse themselves with hunting and other robust exercises. Hence an overflow of health and spirits; and the observation of an able writer, that Ireland produces the stoutest men, and the finest women in Europe, must not be confined to the inferior classes.

The common people of Ireland still retain too many features of national manners. A funeral is joined by all the men and women of the vicinity, and is accompanied with dreadful howls, and other barbarous ceremonies. Their diet consists chiefly of potatos and buttermilk; and the rural cottage is a wretched hovel of mud. The favourite liquor is Usquebaugh, or the water of life; but more properly the water of death, being an ardent and pernicious distillation from corn. It is sometimes rendered a liqueur by admixture with sugar and saffron, or other plants which impart various colours. The children often run

out in a state of nature, to gaze upon the passing stranger; and the dress of the parents is contrived for warmth not for ornament. In former times a remarkable feature of national dress was a puckered shirt, consisting of forty or fifty yards of linen, dyed with saffron, which was regarded as an effectual antidote against vermin. The manners of the country squires, and lower classes of Ireland, are so admirably depicted in a late novel entitled "Castle Rackrent," that the curious may study them as in a most vivacious picture. The amusements of the upper classes are similar to those of the same rank in England; but those of the common people have many shades of discrimination, for instance a funeral is a grand source of joy and amusement*.

LANGUAGE. The English language daily gains ground in Ireland, and might, if proper attention had been bestowed on the national education, have become ere now the general idiom of the country. The ancient Irish is, as is well known, a dialect of the Celtic intermingled with many Gothic words, imported by the Belgic colonies, by the Scandinavians, and by the English. Ireland being the last retreat of the Celts, and of considerable population, the language may be supposed to present the most numerous and genuine specimens of the Celtic denomination. The ancient lives of the saints have preserved many Irish terms, as remote as the sixth and following centuries; and fragments of pious translation descend even to the tenth century. The most venerable remains are the annals of Tighernac, and other writers, of the eleventh and succeeding centuries; and it is unaccountable that these valuable records have not been laid before the public in their original tongue, accompanied with a Latin or English interpretation. The calligraphy of the Irish manuscripts is so similar in every age, that it becomes extremely difficult, even for the antiquary, to discriminate the precise century in which any one was written; but there do not seem to be sufficient grounds to ascribe any now extant to a more remote period than the twelfth or thirteenth century.

The Lord's Prayer in the Irish idiom runs in the following terms:

Ar nathair ata ar Neamh. Naomhthar Hainm. Tigeadh do Rioghachd. Deuntar do Thoil ar an Ttalámh mar do nithear ar Neamh. Ar naran la athamhail tabhair dhuinn a niu. Agus maith dhuinn ar Bhfiacha mar mhaithmidne dar bhféitheamhnuibh fein. Agus na léig sinn a cathughadh. Achd sáor sinn o Olc. Amen.

LITERATURE. The literature of Ireland has a venerable claim to antiquity; for, as has been already mentioned, in the centuries immediately following the introduction of Christianity many writers arose, whose works were not indeed adapted to the popular taste, as they consist of lives of saints, and works of piety and discipline, but to the inquisitive reader they present many singular features of the history of the human mind. Those of the first description, are commonly remarkable for a superabundance of miracles, which are but frugally

* Mr. Young, ii. 229, observes that the Spaniards had a kind of settlement on the coast of Kerry; nor were they expelled till Cromwell's time. The Scotch in the north are still a very distinct race.

distributed in the other European lives of saints. But the national manners, and the peculiar character of the times, are justly delineated, as in the fragments of a broken mirror. The chief glory of the ancient Irish literature arises from the repulsion of the rays of science, after it had almost perished in Europe, on the fall of the Roman empire in the west. The Anglo Saxons, in particular, derived their first illumination from Ireland; and in Scotland, literature continued to be the special province of the Irish clergy, till the thirteenth century.

A most ingenious and respectable writer of the last century * has published a small volume, containing a chronological catalogue of Irish authors, from about the year 450, to his own time, containing about two hundred names; the tenth century, as usual in European literature, being the most barren, whence it is styled by literary men the dark century. The illustrious names of Usher and Ware have been followed by a long train of eminent successors; learning has ripened into genius, and all Europe acknowledges the superior talents of a Burke and of a Sheridan. The late lamented Earl of Charlemont set a distinguished example of the union of rank and literary fame, which it is hoped will be followed by other dignified persons, to the exclusion of low or boisterous relaxation. In some departments of science, Ireland begins to resume her ancient prerogative of reflecting light to Britain; and the name of Kirwan stands almost alone in mineralogy, a branch highly important to the prosperity of nations, but unaccountably neglected in the land of tin.

Education. In no quarter of the British dominions, has education been conducted upon a more solid and rational plan than in Scotland: and no where has it been so much neglected as in Ireland. It is to be hoped that one consequence, and not the least important, of the Union, will be the introduction of parochial education into Ireland, a sure mean of preventing the ebullitions of ignorant discontent, arising often from erroneous views of human life and happiness, and from the weakness of uninformed fanaticism. Those who may justly distrust theory in any political question, may here find the evidence of facts; and may compare the turbulence of the Irish with the peaceable demeanour of the Scottish Highlanders, a congenerous people †. With four archbishopricks, Ireland only possesses one university, that of Dublin ‡. This institution was first projected by Archbishop Leech, about the year 1311; but death having interrupted his design, it was revived and executed by Bicknor his successor, and enjoyed moderate prosperity for about forty years, when the revenues failed. In the reign of Elizabeth the university was refounded by voluntary contribution, under the auspices of Sydney the Lord Deputy. In 1591 it was removed from the precincts of St. Patrick's church to the site of an Augustine monastery; and received a charter from Elizabeth under the style of Trinity College. The first James and Charles were liberal benefactors. It consists of a chancellor, vice-chancellor, provost, vice-provost, twen-

* Sir J. Ware Script. Hibern.

† It may be mentioned, as the height of absurdity, that the few Irish schools refuse the children of Popish parents. Campbell's Phil. Survey, 270.

‡ Gough's Camden, iii. 555.

ty-two fellows, and thirteen professors of various sciences. The number of students is commonly about four hundred, including seventy on the foundation. The building consists of two quadrangles; and it contains a library of some account, and a printing office. Adjacent is a park; and an observatory has been lately erected on the calcareous rock of Dunsurk, about four miles to the N. W.*

At Kilkenny there is an endowed school, or what is called a college; but its institutes seem little adapted to the quiet of an academical life†.

The Dublin Society for the improvement of agriculture and manufactures was instituted by the efforts of the patriotic Dr. Samuel Madden in 1731, being the earliest of the kind now existing in Europe‡.

CITIES. Dublin, the capital city of Ireland, seems to be the Eblana of Ptolemy; but continued little known till the tenth century, when it was mentioned in the Saxon chronicle; and in the beginning of the next century, we have coins of Canute struck at Dublin. The situation is delightful, in a bottom, between ranges of hills on the south and north. It is pervaded by the river Liffy, and by some rivulets. The inhabitants have been estimated at 150,000; this capital being justly accounted the second in the British dominions, and the fifth in the scale of European cities‖.

The circumference of Dublin may be about ten miles, being about two miles and a quarter in length, and as much in breadth. The harbour is incommodious, being impeded with two banks of sand, called the north and south bulls, which prevent ships of large burden from passing the bar; but some improvements have been made, and others might be carried into execution. A mole has been constructed four miles in length; and the quays are spacious and beautiful. There are six bridges, the chief of which is that called Essex. The houses were anciently constructed of wattles daubed with clay. In Elizabeth's time they used timber in the Flemish fashion; and brick and stone were seldom introduced till the last century. The castle was founded about the year 1205, and continues, though in great part rebuilt, to be the sanctuary of the public records, as it formerly was the residence of the viceroy. The parliament house is a superb building, erected at a considerable expence. The church of St. Patrick is the cathedral, a venerable building, which was begun in the end of the twelfth century; but the steeple, the highest in the city, was not erected till the year 1370. The other churches are eighteen in number, several of which are elegant modern erections. The Royal Exchange was completed in 1779; and among other beautiful edifices must not be omitted that whirlpool of expenditure the Custom House; and the houses of the Duke of Leinster, the Earl of Charlemont, and others.

Dublin has an ample supply of native provisions; but coals are imported from Scotland and Cumberland.

The environs of Dublin present many pleasant views, and remarkable objects. St. Stephen's Green is an English mile in circumfer-

* See an account of this observatory in the Transactions of the Royal Irish Academy, vol. i. p. 23.

† Camp. 111.

‡ Young. ii. 210.

‖ Gough's Camden, iii. *554. 558.*

ence, laid out in walks, and planted with trees, in 1670, with an equestrian statue of George II by Van Nost in the centre. The Phœnix park is the Hyde park of Dublin, but barren of trees. Many seats of the nobility and gentry decorate the vicinity of Dublin. The hill of Howth is a peninsular promontory, which forms the north-east side of the bay of Dublin; and about three-quarters of a mile to the north, is Ireland's eye, a small rocky isle. Lambey is a larger island near the shore, full of rabbits, and sanctified by a holy well. Dalkey is a romantic village at the northern base of a mountain, six miles and a half from Dublin: but one of the most pleasant places in the vicinity, is Leixlip, where there is a sulphureous spring, much visited in the summer season, and a noted salmon-leap, so called from these fish darting up the cataract. Swords, six miles to the north, presents a very complete round tower, seventy-three feet in height; and about a mile beyond Kilternen is a remarkable chasm, called the Scalp, in the ridge of a mountain, appearing as if that part had been undermined, and had fallen in.

CORK. In proceeding to give a brief account of the principal towns and cities of Ireland, Cork and Limerick attract the first attention. Cork is a city of considerable importance, situated on the south-east side of the island, and supposed to contain about 70,000 inhabitants. The haven ranks among the most capacious and safe in Europe; and the exportation, the largest in the sister kingdom, consists chiefly of beef, hides, tallow, and butter. It is the grand market of Irish provisions; and it was computed that not less than a hundred thousand cattle were here annually killed and salted, between the months of August and January*. This city lies chiefly in a marshy island, surrounded by the river Lee; but the marshes on the opposite side of the river having been drained, ample space has been given to the recent improvements†.

LIMERICK. Limerick unites the fortunate situation of being almost central to the south of Ireland, with an excellent haven, formed by the long estuary of the river Shannon. The city is accounted the third in Ireland, and was formerly fortified with great care. The episcopal see is said to have been founded in the year 652. The Danes held the city from the ninth century to the eleventh. There are three bridges over the river, one of which consists of fourteen arches. The number of inhabitants has been computed at 50,000. The chief exports are beef and other provisions‡.

The other chief towns in Ireland shall be briefly mentioned, in a geographical progress from the south towards the north.

GALWAY. Galway is a town of considerable note, and carries on an extensive trade with the West Indies. The port is commodious and safe, but distant from the city, which can only be reached by vessels of small burden: the number of inhabitants is computed at 12,000. Greater trade is now carried on in the bay of Sligo than at Galway¶.

* Gough's Camden, iii. 504.

† Mr. Young, vol. i. 417, expresses his astonishment at the populousness of Cork. The duties of the harbour were, in 1751, 62,000*l.*; in 1779, 140,000*l.*

‡ Gough's Camden, iii, 517. ¶ Beauf. 9.

NEWPORT. On Klew bay, in the centre of the west of Ireland, stands Newport; but by some fatality the advantages of the county of Mayo, have not been improved, nor are there any towns of much consequence upon the whole western coast.

SLIGO. Sligo is, however, increasing in trade, and the inhabitants are computed at 8000: and Castlebar is also a prosperous town *.

LONDONDERRY. Londonderry is more remarkable for its ancient and military fame, than for its present commerce, though not unimportant. It stands on the river Foyle, over which a wooden bridge of singular construction, one thousand and sixty-eight feet in length, was thrown in 1791.

BELFAST. Belfast on the north-east is in the centre of the linen manufactures, and may almost be regarded as a Scottish colony. The inhabitants are computed at 18,000. The chief manufactures, cotton, cambric, sail-cloth, linen, with glass, sugar, and earthenware. It maintains considerable intercourse with the commercial city of Glasgow; and the grand exports are to the West Indies.

DUNDALK. Dundalk has also its manufactures of linen and muslin. Drogheda imports sea-coal and goods from England, and exports considerable quantities of grain. It is a well-built town on the Boyne: the inhabitants are computed at 10,000.

WEXFORD. Towards the south-east Wexford claims the first notice, being remarkable for its woolen manufactures; but the haven, though spacious, is not sufficiently deep for large vessels. The inhabitants are 9000.

WATERFORD. Waterford is a city of considerable importance, situated on the river Suir †, and is supposed to have been founded by the Danes. It suffered greatly in the late disorders; and the inhabitants cannot now be supposed to exceed 30,000, The chief exports are beef, pork, &c. and linen. Packet-boats sail regularly betwixt Waterford and Milford Haven.

The sea-ports of Dungarvon and Youghall are lost in the superior consequence of Cork; but Kinsale is a maritime arsenal, and is supposed to contain 8000 souls.

The chief towns in the interior, Armagh, Tuam, Cashel, &c. &c. are rather venerable from their ecclesiastic antiquity, than important in themselves. Kilkenny is, however, an exception; a handsome town, with 16,000 inhabitants.

EDIFICES. Many of the chief edifices of Ireland have been already mentioned in the description of Dublin. The cathedrals seldom aspire to great praise of architecture; and the villas of the nobility generally yield in splendour to those of England, and even of Scotland. Among the principal villas may be mentioned Castletown, not far from Dublin on the south, esteemed one of the most elegant houses in Ireland: Slayne castle on the Boyne, the seat of Lord Conyngham;

* Beauf. 72. Young, i. 291.

† ..... That gentle Swire, that making way
By sweet Clonmel, adorns rich Waterford.
SPENSER.

Mount Juliet on the river Nore, and Woodstock in the same vicinity; Mount Kennedy the seat of General Cunningham; Shaen castle on Lough Neagh; Castle Caldwell on Lough Earn, and Belleisle on the same lake; Florence Court, the seat of Lord Inneskillen; Westport, Lord Altamont's; Woodlawn in Galway, Lord Doneraile's; Castle Martyr, a seat of the Earl of Shannon; Rostellen near Cork; Dundrum, the seat of Lord Montalt; Curraghmoor not far from Waterford; with many others too numerous to be here inserted *.

Though the turnpike roads in Ireland be rather neglected, yet the cross roads are admirable; and Mr. Young has explained at length the principles upon which they are conducted †.

INLAND NAVIGATION. The advantages derived by England from inland navigation soon attracted the attention of Ireland: and not many years after the example set by the Duke of Bridgwater, a grand canal was begun from the city of Dublin to the river Shannon, and was actually carried on to the bog of Allen, at the expence of 77,000*l.* ‡ But the engineer's want of ability occasioned great errors in the original plan and survey; and the work was interrupted in 1770. Nor, unhappily, have proper means been adopted to execute the plan, which remains imperfect, after an expenditure of half a million; and an able writer informs us that even the design was absurd, as the country through which the canal passes is one of the least productive for the Dublin market.¶

But a canal is completed from the town of Newry to the sea, which was however intended to have passed that town towards the Collieries of Drumglass and Dungannon. This attempt, however, to supply Dublin with Irish coals has hitherto been only successful in part, though the beds of coal are said to be very abundant.

The parliament of Ireland has also granted considerable sums for the canals of Lagan, Dromreagh, Blackwater, and for improving the navigation of the rivers Shannon, Barrow, and Lee. But in the first place, the avaricious and jobbing spirit of the persons employed; and latterly, the distracted state of the country, have hitherto impeded these noble intentions.

MANUFACTURES AND COMMERCE. Though we find, as has been already mentioned, that Ireland was distinguished at an early period for her manufacture of woolen stuffs ||, yet the spirit of industry made little progress, and the chief Irish manufactures are of recent institution. But the linen manufacture was not unknown in Ireland in more early times, as appears from acts of parliament in the reigns of Henry VIII, and Elizabeth. In that of William III it became an object of consequence; and in 1699 such high duties were imposed upon Irish woolens, that the manufacture was nearly abandoned, and the efforts of industry directed to the linen trade. The annual

* Mr. Young, ii. 349, observes that the buildings in Ireland have been almost wholly renewed since 1760, in cities, towns, and country seats: and the improvements were proceeding with great rapidity till the late unfortunate commotions.

† Vol. ii. 151. ‡ Philips, 330.

¶ Young's Tour in Ireland.

|| See a dissertation by the Earl of Charlemont, T. R. A. vol. I.

produce of the linen manufacture is computed at about 2,000,000*l.* sterling.*

But a grand portion of the commerce of Ireland arises from her abundant stores of black cattle, the moisture of the climate rendering the pasturage remarkably luxuriant.

In 1780 Mr. Young computed the average imports of Ireland at 1,240,677; and the exports at 2,012,202*l.* Yet he afterwards calculates the exports at about 3,000,000 and an half; and the balance of trade in her favour at above 1,000,000.†

* Young, ii. 283. 301.

† Tour in Ireland, ii. 333. 352. Dr. Beaufort in his Memoir, p. 145, says that on an average of seven years, to 1791, Ireland exported to the amount of 4,357,000*l.*

CHAPTER IV.

NATURAL GEOGRAPHY.

CLIMATE AND SEASONS.—FACE OF THE COUNTRY.—SOIL AND AGRICULTURE.—RIVERS.—LAKES.—MOUNTAINS.—FORESTS.—BOTANY.—ZOOLOGY.—MINERALOGY.—MINERAL WATERS.—NATURAL CURIOSITIES.

CLIMATE AND SEASONS. IRELAND lying nearly in the same parallel with England, the difference of climate cannot be supposed to be very important. The mean temperature of the north is about 48; of the middle 50; of the south 52 of Farenheit*. In the sixth volume of the transactions of the Royal Irish Academy may be seen a curious Memoir on the climate of Ireland, by the Rev. William Hamilton, in which the ingenious author attempts to account for a considerable change in the seasons, which has happened almost within the memory of the present generation, particularly the mildness of the winters, while the summers are less warm and genial. He supposes that the western winds are more violent, whence many kinds of trees cannot prosper, and even the ash threatens a speedy annihilation. He observes the progress which the sands have made, particularly at the entrance of the river Bannow, in the county of Wexford, where the town of Bannow, formerly so considerable as to send members to Parliament, has been overwhelmed; as has a gentleman's residence in the county of Donnegal. The tides have also assumed more power and violence. From all these circumstances, Mr. Hamilton shews the superior power of the western gales, and the consequent production of a humid and ungenial climate. He supposes that the prevalence of the western winds is chiefly owing to the eradication of forests in Europe, Asia, and America.

FACE OF THE COUNTRY. In considering the face of the country it must be remembered that Ireland forms a striking contrast to Scotland, being mostly level, fertile, and abundant in pasturage. The chains of hills, for they can hardly aspire to the name of mountains, are few and unimportant.

SOIL AND AGRICULTURE. The soil and agriculture of Ireland are topics which have been ably illustrated by an intelligent writer†. He observes that the quantity of the cultivated land exceeds in proportion that of England. The most striking feature is the rocky nature of the soil, stones generally appearing on the surface, yet

* Trans. R. I. A. vol. ii. † Young's Tour, ii. 72.

without any injury to the fertility; whence the soil may be defined a stony clay, a stony loam, a gravelly sand, &c. The stones are generally calcareous, and appear at no great depth, even in the most flat and fertile parts, as Limerick, Tipperary, and Meath. The climate being more moist than that of England, the verdure never appears parched with heat*. Tillage is little understood, even in the best corn counties, as Lowth, Kildare, Carlow, and Kilkenny, turnips and clover being almost unknown: the wheat sown upon fallow, and followed by several crops of spring corn. The farmers are oppressed by the shocking system of *middle men*, who rent farms from the landlords, and let them to the real occupiers; who, as well as the proprietors, suffer greatly by this strange practice. Even under these abuses Ireland is a most fertile country; and if agriculture were duly improved, might be a treasury of grain. Even the bogs, among which that of Allen extends eighty miles, and is computed to contain 300,000 acres, might generally be drained, and converted into fertile meadows. Lime-stone gravel is a manure peculiar to Ireland; having on uncultivated land the same wonderful effect as lime, and on all soils it is beneficial†.

RIVERS. Among the chief rivers of Ireland must first be mentioned the Shannon, which rises from the lake of Allen, and passing through two other large lakes, Lough Ree, and Lough Derg, afterwards extends below Limerick into a vast estuary or Frith, about sixty miles in length, and from three to ten in breadth‡. This noble river is, almost through its whole course, so wide and deep as to afford easy navigation. Boate informs us that the celebrated Earl of Strafford designed to remove a rock, six miles above Limerick, which forming a cataract impedes the intercourse between the upper and lower parts. The whole course of the Shannon may be computed at one hundred and seventy miles.

The other rivers of Ireland have little of this majestic character.

BARROW. The river Barrow rises about forty miles to the west of Dublin, near the source of the Boyne; and after a course of about one hundred miles enters the sea on the south-east, having received the rivers Nour, and Suir, and formed the harbour of Waterford.

BLACKWATER. The Blackwater, another considerable stream in the south, enters the sea at Youghall Bay.

The Slaney forms the harbour of Wexford.

The Liffy is an inconsiderable stream, ennobled by the capital.

The Boyne, after a course of about fifty miles, also enters the eastern sea: the other rivers on the east are small and unimportant.

BANNA. In the north the Banna is a considerable stream, which pervades Lough Neagh, and enters the sea after a course of about seventy miles. By the canal of Newry it communicates with Carlingford bay; and thus insulates the north-east projection of Ireland.

* The Curragh of Kildare is a most beautiful lawn, of above 4000 English acres, a sheep-walk of the softest turf, and most delicious verdure. Young, ii. 7.

† Ibid. 171.

‡ Boate, p. 36.

FOYL. The river Foyl passes by Londonderry, and has a considerable estuary called Lough Foyl. The Swilley is of inconsiderable length, but forms a long estuary.

On the north-west Lough Earn issues into Donnegal bay by a considerable stream: but no other river of consequence occurs till we reach the estuary of the Shannon; nor are the rivers on the south-west of much note.

LAKES. The lakes of Ireland are numerous, and some of them extensive. The term *Lough*, corresponding with the Scottish *Loch*, is sometimes applied to an estuary, or to an inlet of the sea, such as the Swilley, the Foyl, that of Strangford in Down, &c.

EARN. The chief lake of fresh water is that of Earn, which exceeds thirty British miles in length, and twelve in its greatest breadth; it is divided by a narrow outlet, from the southern part into the northern, of about four miles in length.

NEAGH. Next in magnitude is Neagh, about twenty-two miles in length, and twelve in breadth. Both these lakes are studded with small islands; and the latter is said to possess a petrifying quality. It seems however rather to belong to the adjacent soil*.

CORRIB. The lake of Corrib, in the county of Galway, is about twenty miles in length, and from two to five wide. Those of Ree and Derg are less considerable in size: and there is a smaller lake also named Derg, in the N. W., which was remarkable in superstitious times for a little island, containing what was called the purgatory of St. Patrick†.

LOUGH OF KILLARNEY. Among the lakes of the second magnitude, must be first named the beautiful and interesting Lough of Killarney in the S. W., abounding with romantic views, and fringed with the arbutus no where else a native of the British dominions. This is almost the only lake in the south of Ireland; and the observation may be extended to the east. On the N. W. are the lakes of Eask, Trierty, Melve, Macnean, and Gill. That of Allen, as already mentioned, is a chief source of the Shannon, into which the Gara and Key also pour their waters. Further to the west are two considerable lakes, the Conn and the Mask; nor must those of Corrafin be forgotten.

MOUNTAINS. The mountainous chains in Ireland are neither numerous nor important; but an upland ridge divides the country from the N. E. to the S. W., giving birth to several of the rivers. The Irish hills generally form short lines, or detached groups. One group of considerable height appears on the west and south of Lough Lane, or what is called the Lake of Killarney: of these Mangerton is 2500 feet above the sea‡. A small line of hills extends on the north-

* Smyth in Boate, p. 121. † Ware, p. 219, ed. 1658.

‡ Mr. Young, i. 458, says Mangerton is 835 yards (2505 feet) above the level of the sea. From an intelligent correspondent in Ireland the following note has been received, concerning the height of the chief Irish mountains.

Slieve Donard, Co. Down.	3150 feet....is said to have been measured by the barometer,....probably not so high.

west of Bantry Bay, and passes to the east, under the name of the Shehy mountains*. To the north of this is the line of Sliblogher and Nagles: followed by the Galtee mountains; and towards the East are those of Knockendown, which bend southward towards the bay of Dungarvon. A small chain also appears to the south of Tralee, which with a group to the N. E. may be said to complete the enumeration of the mountains of Munster.

In Leinster is a mountain so called, the line of Slieb-loom on the S. W., and a considerable group to the south of Dublin, styled the Kippure mountains, or those of Wicklow. The extent of this group is about thirty English miles in length, by about twelve in breadth.

In Ulster is a small group, called the mountains of Mourne, in the S. E. corner of the province: one of them, Donard, is said to be about the height of Mangerton. The hills of Slievecroob (in the Irish language *sliébh* signifies a mountain), form the centre of the county of Downe; and several hills are sprinkled over the eastern half of Antrim. On the north-west of Loughnear are those of Slievegallan, and Carntogher. Slieve Snaght is a considerable mountain N. W. of Loughfoyl, whence other lines and groups extend down to Loughern.

The eastern part of Connaught presents numerous marshes; but few mountains except those of Baughta on the south. The extreme western peninsula is one of the most mountainous regions in Ireland. Among other names may be mentioned mount Nephin in the county of Mayo, a solitary hill of 2640 feet, and one of the most considerable in the island. That of Croagh Patrick on the S. E. of Clewbay, a cone of 2666 feet; the Fernamoor mountains to the west of Loughmask; and the Twelve Pins, a line of so many small peaks in Ballinahinch; with others to the south of Loughcorrib.

Forests. Scarcely the semblance of a forest remains in Ireland; and Boate has long since observed that the woods have been greatly diminished since the entrance of the English, partly from the extension of tillage, and partly from the necessity of opening up the recesses of banditti†. Another great cause was the consumption in domestic fuel, and the iron manufactures, the coal mines not having been explored. Yet Boate informs us that considerable woods existed in his time in Wicklow, Wexford, and Carlow; Kerry, Tipperary, and Cork. The province of Ulster also boasted of extensive forests, in the counties of Donnegal, Tyrone, Fermanagh, and Antrim. The western province of Connaught, being the most remote from the new

Mangerton, Co. Kerry. — 2500 above the level of the lake of Killarney, not above the sea as Beaufort asserts, p. 91....taken geometrically by Taylor.

Croagh Patrick, Co. Mayo. — 2666 above the sea, taken barometrically by (it is believed) Mr. Kirwan.

Nephin, same Co. — 2640 above the sea, by the same.

Cumeragh, Co. Waterford. — 2160 by barometer, taken by Smith, p. 207.

Knock Meledown, Co. Waterford, N. of Lismore. — 2700, Smith's Waterford, p. 210, which explains the principles adopted in his mensuration.

* Beaufort's Memoir of a map of Ireland. † p. 67.

colony, was in his time stored with trees; but the most noted forests were in the counties of Mayo and Sligo.

Moors or Bogs. The place of the forests was unhappily usurped by the moors or bogs, which form a remarkable feature of the country. Boate divides them into several genera and species, forming an elaborate scale of sterility. The dry heaths are chiefly confined to the mountains. The bogs he subdivides into four descriptions: 1. The grassy, in which the water being concealed by herbage, they become extremely perilous to travellers: some of these are dry in the summer. 2. The pools of water and mire. 3. What he terms hassocky bogs, or shallow lakes studded with tufts of rushes, which are chiefly found in the province of Leinster, especially in King's and Queen's counties. 4. The peat moors. In the Transactions of the Royal Irish Academy*, there is a curious account of the formation of a bog, by the motion of a peat moor after a heavy rain: the peat moor at the same time, by obstructing the course of a stream, formed a considerable lake, in the space of half a day. But this event was rather of a local nature; and the formation of bogs seems to be owing, in many instances, to the moisture retained in those parts of forests which chance to form hollow receptacles, the fall of the leaves forming a vegetable earth, supersaturated with moisture, so that the trees themselves in time fell a prey. Ornaments of gold and other relics of antiquity, have from time to time been discovered in the bogs at great depths; and there are other indications that they are of comparatively recent formation. It is hoped that the hand of industry will in time remove many of these blemishes; and one of the greatest improvements of modern agriculture is that of reclaiming peat moors, by means of calcareous manure. Mr. Young only divides the bogs into two sorts, the black and the red; the former being solid almost to the surface, and generally improveable, though at great expense. The red is so called from a reddish substance, five or six feet deep, which holds water like a sponge, yields no ashes in burning, and is supposed to be utterly irreclaimable. Trees are found in both, and they are supposed to originate from fallen forests. Both differ from the English morasses; the Irish being rarely level, but rising into hills; and there is a bog in Donnegal, that is a perfect scenery of hill and dale. The plants are heath, with some bog myrtle, and a little sedgy grass†.

Botany. The study of Botany has been less cultivated here than in any other part of the united empire; and the neighbourhood of Dublin, which has been best explored, affords no rare, and few characteristic plants. From the general mildness of the climate, the extensive tracts of bog, and the vast mountainous ranges that intersect the country, and afford capacious basons for its numerous lakes, it is obvious that the Flora of Ireland, when completo, will probably contain several species that are strangers to the rest of the British islands. On the mountains of Sligo is found the Saxifraga umbrosa, (known in our gardens by the name of *London pride*), and the romantic scenery of Killarney in the county of Kerry is the most northern *habitat* of

* Vol. ii. p. 3. † Vol. ii 177.

the Arbutus Unedo: the heaths abound with the stately Erica Daböeci, and the Dryas octopetala, Arbutus uva-ursi, with other Alpine plants already noticed in the botany of Scotland, expand their neglected blossoms, and trail their glowing festoons of clustered berries, unnoticed amidst the wide solitude of their rocky fastnesses.

Zoology. In passing to the Zoology of Ireland, it may be expected that not many varieties should be found between the Irish animals and those of England. It is asserted that no poisonous animal will live in Ireland; and even that no spiders will haunt Irish timber, which, as is said, was the cause why it was often employed in magnificent ceilings in the middle ages. As in fact England affords no poisonous animal, except the viper, this position implies, in other words, that no vipers are found in Ireland.

The Irish horses, called hobbys, are of a small breed, remarkable for the gentleness of their pace.

The Irish hound is one of the noblest animals of the class, and formerly celebrated for his size and vigour, but the breed is now almost extinct.

Bede has commemorated the praise of Ireland for abundance of honey, and of milk, so that the country seems even in early times to have abounded in cattle. He also mentions the numerous herds of deer, which animal the progress of cultivation has now rendered rare. In various parts of Ireland are dug up enormous horns of deer, which some writers have imagined were of the species called Moose deer in America; but Mr. Pennant has demonstrated that the animal must have almost doubled in size the American monster, which is sometimes found seventeen hands in height*. The Irish horns have been found of the extent of fourteen feet from tip to tip, furnished with brow antlers, and weighing three hundred pounds; the whole skeleton is frequently found with them. It is supposed that the animal must have been about twelve feet high.

Mineralogy. The mineralogy of Ireland has been recently ennobled by the discovery of considerable masses of native gold, in the county of Wicklow, to the south of Dublin. These were found in a brook, running west to east, to the river of Avonmore, where it is joined by the river Aghran; and on a declivity of the mountain called Croughan Kinshelly, about seven English miles west of Arklow, and six south-west of the noted copper mines of Cronbane†. It is said that a jeweller who lately died in Dublin, often declared that gold from that spot had passed through his hands to the value of 30,000*l.*, the secret being retained for many years, and some pieces weighing to the amount of seventy or eighty guineas. It is now worked for government, and it is said that a very massy vein has been recently discovered, which it is hoped will greatly benefit the country; for mines have in all ages, ancient and modern, enriched and improved the countries where they were found, and the exception, if such, of Spanish America is to be assigned to causes of a different nature.

Gold is also reported to have been anciently found in the province of Ulster, in the sand of a rivulet called Miola, which falls into the

* A. Z. Vol. i. p. 23. † Philos. Trans. 1797.

north-west corner of the lake called Neagh*. As minute particles of gold are sprinkled through most regions of the world, so in some instances a few may find opportunities to combine, by the law of aggregate attraction, and thus excite notice without any chymical procedure. But to infer from such a discovery that considerable quantities of this precious metal must be found in the mountains, whence the streams have chanced to convey golden sand, or even small fragments, might only lead to rash and speculative adventure; for even in the favourite regions of native gold, it has sometimes been found that a river or rivulet had actually carried down what little gold originally existed in the mountain. Another consideration remains well known in Peru and Hungary, namely, whether more gold may not be expended than procured, in working a mine, if virtually discovered.

Silver. The silver found in the Irish mines deserves more attention. Boate mentions a mine of this metal, intermingled with lead, which was wrought in the county of Antrim, and yielded a pound of pure silver from thirty pounds of lead. Another, less productive of silver, was found near the harbour of Slago in Connaught; and a third in the county of Tipperary, twelve miles from Limerick. The ores at this last were of two kinds, most generally of a reddish colour, hard and glistering; the other, which was the richest in silver, resembled a blue marl. The works were destroyed in the Irish insurrections under Charles I.

Copper. Copper has been recently found in the county of Wicklow, and at Muccross in Kerry.

Iron. One of the chief mineral productions of Ireland is iron, the mines of which were little known till the time of Elizabeth. Boate divides the iron mines of Ireland into three descriptions: 1. What he styles the bog mine, or what is now termed lowland ore, found in moors and bogs; the ore resembling a yellow clay, but mouldering into a blackish sand 2. The rock mine, a bad sort, the ore intimately combined with stone. 3. That found in various mountains, the ore spheric, and of a whitish grey colour: balls of the best ore contained kernels full of small holes, whence the name honey-comb ore. Boate praises this iron as frequently rivalling that of Spain: and his work may be consulted for the manner of conducting the foundries.

Coal. The beds of coal to be seen in various regions of Ireland, have not yet been explored to their proper extent. That of Kilkenny, found at Castlecomer, is deservedly celebrated among mineralogists, as the purest which has yet been traced in any quarter of the globe. Even as early as the time of Boate, coal was accidentally discovered in an iron mine, in the county of Carlow.

One of the most beautiful marbles of Ireland is found near Kilkenny; and others have been discovered in various parts of the island. Boate brands the free-stone of Ireland as being liable to imbibe the moisture of the atmosphere; to prevent which effect it was necessary to incrust the walls with brick, or to line them with wainscoat. Slate of various kinds is also abundant.

* Boate, p. 69.

MINERAL WATERS. For mineral waters Ireland has never been famous. There is a spring, as already mentioned, at Leixlip, more celebrated from fashion than from potency. As Ireland contains abundance of iron, it is almost unnecessary to add that there are many chalybeate waters in several parts of the country. The most remarkable are that of Ballynichinch in the diocese of Dromore; Ballyspellan, not far from Kilkenny; and Kanturk and Mallow, in the county of Cork: the last a tepid spring. There is another Spa at Farnham, near Lough Earn.

NATURAL CURIOSITIES. Among the natural curiosities of Ireland, would in ancient times, have been mentioned the purgatory of St. Patrick, a miserable monkish delusion. At present the lake of Killarney attracts more deserved devotion. This picturesque expanse of water is about ten miles in length, and from one to seven in breadth: it is divided into three parts, called the upper, lower, and Muckruss lake; and is surrounded by an amphitheatre of mountains, clothed with trees, whose verdure is contrasted with intervening rocks. The Arbutus, with its scarlet fruit and snowy blossoms, here vegetates in great luxuriance. Nor are cascades, and other features of rural beauty, wanting to complete the scene*. The isle of Innisfallen is not only romantic, but of venerable fame for the annals there written.

The petrifying power of Lough-neagh has been found, as already mentioned, rather to reside in the circumjacent soil†. The petrifications seem to be chiefly of oak; and the stump of a tree with the roots has been found wholly petrified; but from the account given by Mr. Smith the petrification seems to be slight.

What is called the Giant's Causeway must be distinguished among the most remarkable of the curiosities of Ireland. When we recollect that a similar production, the celebrated island of Staffa, remained unnoticed till within these thirty years, we shall be the less inclined to wonder that the Giant's Causeway is an object of recent observation, and has escaped the notice of Giraldus Cambrensis, Stanyhurst, and even of the accurate and ingenious Ware: the first account is that given by Sir R. Buckley in a letter to Doctor Lister 1693. This surprising collection of basaltic pillars is about eight miles N. E. from Coleraine‡. The adjacent coast is verdant but precipitous; and from it the Causeway projects into the sea, to an unknown extent. The part explored is about six hundred feet in length; the breadth from two hundred and forty to one hundred and twenty; the height from sixteen to thirty-six feet above the level of the strand. It consists of many thousand pillars, mostly in a vertical position, some of them high; others broken, and, for a considerable space, of an equal height, so as to form a pavement. They are closely compacted together; though the form be various, trigonal, tetragonal, pentagonal, hexagonal, and heptagonal; the most numerous are the pentagonal. The pillars are rarely composed of one entire piece, but mostly consist of short or long joints, either plane, or concave corresponding with convex. The pillars are from

* Young, i. 444, &c. † Boate, p. 122. ‡ Ibid. 150.

fifteen to twenty-four inches, or more, in diameter. The adjacent shore is mostly the common crag; but there are a few irregular pillars on the east; and towards the north-east, what is called the organ, in the side of a hill, consisting of fifty pillars; that in the middle forty feet high, the others gradually diminishing. Similar pillars are also found a mile and a half inland, four miles to the west of the Giant's Causeway.

The learned Dr. Pococke examined this remarkable object with great care, and gave an account of it in the Philosophical Transactions. Mr. Hamilton has recently investigated the northern coast of Antrim with scientific skill; and some particulars shall be extracted from his account. The grand features of this coast are the capes of Bengore and Fairhead, precipitous promontories distant about eight miles. Bengore is composed of several smaller capes and bays; and contains a vast quantity of columnar basalt. The cape called Pleskin presents a magnificent gallery, or colonnade, about sixty feet high, with a lower gallery about fifty. The lower ranges contain the most sharp and exact columns. The promontory of Fairhead offers pillars of greater length and coarser texture: and similar stones are found in the mountain of Dunnel, between Coleraine and the river Bush; in the small isle of Raghry, two miles north of Fairhead; and in various other circumjacent quarters, along a coast of fifty miles in length, by two in breadth. Nay, imperfect appearances of the same kind may be traced even to the lake of Neagh, and mountains of Derry; so that the effects have operated to a space of more than forty miles in length, and twenty in breadth, that is above eight hundred square miles. Mr. Hamilton might have added that even the island of Staffa, at the distance of one hundred miles, seems to form part of the same series, which may be carried to an unknown extent, through the bed of the intervening sea. The basalt of the Giant's Causeway is of a very compact texture, and the angles of the pillars have preserved their sharpness, though exposed to the sea, for perhaps two or three thousand years*. The origin of this substance is matter of intense dispute between the Vulcanists and Neptunists; but such geological discussions are foreign to the nature of this work. Suffice it to observe that basalt contains a mixture of silicious and argillaceous earth, together with iron to the amount of one quarter; a proportion of that universal pervading mineral, which may well arrange basalts under the class of iron; and it is remarkable that some hematites when broken present the same columnar appearance. Mr. Hamilton infers that the pillars of the Giant's Causeway are magnetic; and says, that in the semi-circular bays about Bengore the compass is much deranged. The same shore also presents horizontal and bending pillars, like those of Staffa; the attendant minerals are zeolite in the irregular basalt, steatite, and bits of agate, red ochre, and iron ore. Mr. Hamilton, pursuing the Vulcanic theory, even adds pumice and pipereno; but these substances are rejected by Mr. Kirwan, who infers that the detection of clay, steatite, or zeolite, in basalt, is a proof that it is not a volcanic substance.

* Kirwan Min. i. 232.

Among the natural curiosities of Ireland must not be forgotten the Dargle, about twelve miles to the south of Dublin, an enchanting glen, finely wooded with oak, and near a mile in length, with high precipices, and a picturesque river, which Mr. Young describes as a singular place, and different from any which he had seen in England*. In the neighbourhood of Mitchelstown, at the foot of the Galtee mountains, is a cave in a lime-stone rock, the entrance of which is narrow; but from a vault, of about one hundred feet long and fifty or sixty in height, there extends a winding course of not less than an Irish half mile, exhibiting great variety of appearances, sometimes that of a vaulted cathedral, supported by massy columns with incrustations of spar, nearly as brilliant as the Bristol crystals. Mr. Young prefers this cave to that of the Peak in Derbyshire; and has also esteemed it superior to the Grau d'Aucel†.

* Tour in Ireland i. 111. † Ibid. ii. 61.

IRISH ISLES.

IRISH ISLES. THE few, and small isles around Ireland are unimportant, but must not be wholly omitted. To the N. E. of Dublin is Lambey, a small island already mentioned; and at the S. E. extremity of Ireland appear the rocks called Taskard and the Saltee isles. At the southern extremity is the isle of Clare, about three miles and a half in length, and more remarkable for its southern promontory called Cape Clear, than for any other object. Turning to the N. W. are the isle of Densey, the Hog Islands, and the Skelligs; to the north of the latter is Valentia off the coast of Kerry, which is followed by the Blaskets or Ferriter islands. The south Arrin islands lie at the mouth of the noble bay of Galway, and are remarkable for a small kind of oats without any husk, and for large calves: the chief is near seven miles in length. A number of small islands encircle the coast which projects furthest into the Atlantic, such as Garonena, Littermore, Minish, Inconee, and further to the N. W. Dunloghan, Omey, and Crua, &c. Bofin was famous in the days of monastic sanctity, and has retained its ancient appellation. To the N. E. are the Inisture, and another Clare at the mouth of Clew Bay; at the bottom of which is a numerous group of small islands. To the north is Achill, the largest of the Irish isles, being about twelve miles long by ten broad. It is separated from the coast of Mayo, by a narrow channel, but no minute description of it has appeared. Inisnuorry is a small isle at the mouth of the bay of Donnegal; and no other isles worth mention appear, till we arrive at the northern islands of Arrin off the coast of Donnegal. The N. W. extremity of Ireland is marked by Tory isle: and returning towards the east we meet with Inistrahull: and after an equal distance Rachlin, the Ricina of Ptolemy, and memorable as the retreat of Robert I of Scotland.

FRANCE.

CHAPTER I.

HISTORICAL GEOGRAPHY.

NAMES.—EXTENT.—BOUNDARIES.—ORIGINAL POPULATION.—PROGRESSIVE GEOGRAPHY.—HISTORICAL EPOCHS AND ANTIQUITIES.

NAMES. FRANCE, deservedly celebrated amongst the most eminent European states, was probably known to the Phœnicians, though the superior fame of the metallic riches of Spain have almost eclipsed their discovery of Gaul. In the year 600 before the birth of Christ; according to the chronology of Usher, the Phocæans sailing from Ionia founded Massilia, or Marseilles; yet Herodotus, who flourished a century and a half after that period, shows so little knowledge of Gaul as to suppose that the Danube arose in the Pyrennees. The ancient inhabitants were the Celts, of whom even Aristotle seems only to have learned that they inhabited the region above Iberia or Spain. The southern parts of Gaul became known at an early period to the Romans, who entered that region about one hundred and twenty years before the christian epoch, and soon afterwards founded the province termed Gallia Bracata: but the remainder of this large and fertile country was reserved for the discovery and conquest of Julius Cæsar. The ancients sometimes styled it the country of the Celts, but the only general name seems to have been Gallia, which, after the fall of the Roman empire, was supplanted by that of Francia or France, because it was subdued and possessed by the Franks, an assemblage of tribes from Lower Germany.

EXTENT. The extent of France before the recent acquisitions was computed at 148,840 square miles; and supposing the then population to be 26,000,000, would render 174 inhabitants to each mile square*. The boundaries were, on the west, the Atlantic Ocean; on the south, the Mediterranean and Pyrenees; on the east, Savoy, Swisserland, and Germany; on the north, the Austrian Netherlands, the German sea, and English channel. It extends from about the 42d to near the 51st degree of north latitude; from about the 7th degree of longitude west from Paris to about the 5th on the east; being in length N. to S. about 600 British miles, and in breadth W. to E. about 560.

ORIGINAL POPULATION. The original population of Gaul has been ably illustrated by many authors. The primitive inhabitants were the Celts, to whom no anterior people can be traced in the western regions of Europe; but on the S. W. the Aquitani, of African descent, had passed from Spain; and on the N. E. the warlike German tribes, known by the name of Belgæ, had seized on a third part of the country, where they introduced the Gothic language and manners. On the S. also the German Gauls had diffused themselves into what was called Gallia Bracata: nor must the Greek colonies be forgotten. The solidity and duration of the Roman conquests diffused the Latin language through all ranks. On the N. W. extremity it is probable that there were remains of the ancient Celts, before the British colony proceeded there in the fifth century, and imparted a name to the district. The Franks from Germany, no doubt, contributed considerably to the population, and were the ruling people, though not the most numerous; and their language was in the course of a few centuries immerged in that of the former population.

PROGRESSIVE GEOGRAPHY. The Romans first illustrated the geography of Gaul, which they considered as divided into three chief regions, the Celtic, the Belgic, and Aquitanic; the Provincia Bracata being almost forgotten in the extent of their subsequent conquests. These regions were again subdivided into no less than seventeen provinces. On the subversion of the Roman power new names and divisions succeeded, as Flandria, Lotharingia, Neustria, Burgundia, Vasconia, &c.†: while Aquitania and Provincia remained ancient names, though not within ancient boundaries. These were succeeded by divisions yet more modern, which in recent times have been supplanted by more minute departments.

ANCIENT PROVINCES.	DEPARTMENTS.	CHIEF TOWNS.
Flandre Françoise.	Nord.	Douai.
Artois.	Pas-de-Calais.	Arras.
Picardie.	Somme.	Amiens.
Normandie.	Seine Inférieure.	Rouen.
	Calvados.	Caen.
	Manche.	Coutances.
	Orne.	Alençon.
	Eure.	Evreux.

* Bœtticher, p. 18. Mr. Young, Travels i. 235, supposes France to contain 186,282 square miles, or rather, with Necker, 131,722,295 English acres; while Great Britain and Ireland may present an area of 99,335,589 acres.

† D'Anville. Etats formés en Europe.

ANCIENT PROVINCES.	DEPARTMENTS.	CHIEF TOWNS.
Isle de France.	Seine.	Paris.
	Seine and Oise.	Versailles.
	Oise.	Beauvais.
	Aisne.	Laon.
	Seine and Marne.	Melun.
Champagne.	Marne.	Châlon's-sur-Marne.
	Ardennes.	Mézières.
	Aube.	Troyes.
	Haute Marne.	Chaumont.
Lorraine.	Meuse.	Bar-sur-Ornain.
	Moselle.	Metz.
	Meurthe.	Nancy.
	Vosges.	Epinal.
Alsace.	Haut-Rhin.	Colmar.
	Bas-Rhin.	Strasbourg.
Bretagne.	Ille and Vilaine.	Rennes.
	Côtes-du-Nord.	St. Brieux.
	Finisterre.	Quimper.
	Morbihan.	Vannes.
	Loire Inferieure.	Nantes.
Maine and Perche.	Sarthe.	Le Mans.
	Mayenne.	Laval.
Anjou.	Mayenne and Loire.	Angers.
Touraine.	Indre and Loire.	Tours.
Orlèanois.	Loiret.	Orléans.
	Eure and Loire.	Chartres.
	Loire and Cher.	Blois.
Berri.	Indre.	Châteaurou
	Cher.	Bourges.
Nivernois.	Nièvre.	Nevers.
Bourgogne.	Yonne.	Auxerre.
	Côte d'Or.	Dijon.
	Saône and Loire.	Mâcon.
	Ain.	Boúrg.
Franche-Compté.	Haute Saône.	Vesoul.
	Doubts.	Besançon.
	Jura.	Lons-le-Saunier.
Poitou.	Vendée.	Fontenay-le-Peuple.
	Deux-Sèvres.	Niort.
	Vienne.	Poitiers.
Marche.	Haute-Vienne, comprising part of Limosin.	Limoge.
	Creuze.	Guèret.
Limosin.	Corrèze, comprising part of Upper Vienne.	Tulle.
Bourbonnois.	Allier.	Moulins.
Saintonge, comprising Aunis	Charente-Inferieure.	Saintes.
Angoumois, comprising part of Saintonge.	Charente.	Angouleme.
Auvergne.	Puy-de-dôme.	Clermont.
	Cantal.	St. Flour.

ANCIENT PROVINCES.	DEPARTMENTS.	CHIEF TOWNS.
Lyonnois.	Rhône.	Lyon.
Forêt and Beaujolois.	Loire.	Montbrison.
	Isére.	Grenoble.
Dauphiné.	Hautes-Alpes.	Gap.
	Drôme.	Valence.
Guyenne, comprehending Gascogne.	Dordogne.	Perigueux.
	Gironde.	Bordeaux.
	Lot and Garonne.	Agen.
	Lot.	Cahors.
	Aveyron.	Rhodez.
	Gers.	Auch.
	Landes.	Mont-de-Marsan.
	Hautes Pyrénées.	Tarbe.
Béarn.	Basses Pyrénées.	Pau.
Comte-de-Foix.	Arrierege.	Tarascon.
Rousillon.	Pyrénées-Orientales.	Perpignan.
Languedoc.	Haute Garonne.	Toulouse.
	Aude.	Carcassonne.
	Tarn.	Castres.
	Gard.	Nimes.
	Lozere.	Mende.
	Ardéche.	Privas.
	Haute-Loire.	Le Puy.
	Héraut.	Montpellier.
Provence.	Bouches du-Rhone.	Aix.
	Basses-Alpes.	Digne.
	Var.	Toulon.
Corsica.	Golo.	Bastia.
	Liamone.	Ajaccio.

ANCIENT NAMES.	DEPARTMENTS RE-UNITED.	CHIEF TOWNS.
Territory of Avignon, county of Venaissin, Principality.	Vaucluse, with the Bouches du-Rhone.	Avignon.
District of Apt.	Mont Blanc.	Chamberry.
Savoy.	The Maritime Alps.	Nice.
County of Nice.	Mont Terrible.	Porentruy.
Bishoprick of Bâle.		
Austrian Hainaut.	Jemmapes.	Mons.
Western part of Austrian Flanders.	Lys.	Bruges.
Eastern part of Flanders.	Escaut.	Gand.
Eastern part of Brabant.	Deux Nethes.	Anvers.
Southern part of Brabant.	Dyle.	Bruxelles.
Part of the country of Liege, and of Gelderland.	Meuse inferieure.	Maëstricht.
Part of the countries of Liege, and of Limbourg, with the principalities of Stavelo, and Malmedi.	Ourthe.	Liége.

ANCIENT PROVINCES.	DEPARTMENTS.	CHIEF TOWNS.
County of Namur.	Sambre and Meuse.	Namur.
Duchy of Luxembourg.	Forêts.	Luxembourg.
Part of the Archbishopric of Trêves.	Rhine and Moselle.	Coblentz.
Part of the Archbishopric of Trêves, and of the Duchy of Deux Ponts.	Sarre.	Tréves.
Part of the ancient Archbishopric of Mayence, and of the Duchy of Deux Ponts.	Mont Tonnerre.	Mayence.
Part of the Archbishopric of Cologne, of the Duchy of Juliers, of Prussian Gelderland, of Cleves, Meurs, &c.	Roer.	Aix-la-Chapelle.
Of the territory of Geneva, of the districts of Gex, Larouge, Thonon, &c.	Leman.	Genéve.

HISTORICAL EPOCHS. The chief historical epochs of France may be arranged in the following order:

1. The primitive population of the Celts, and the conquests of the Aquitani, and Belgæ.

2. The faint notices of the ancients concerning Gaul, from the establishment of the Phocean colony at Marseilles, to the conquest by Cæsar.

3. The complete disclosure of the country to the learned world by that great general; and the various revolutions and events of which it was the theatre under the domination of the Romans.

4. The final conquest of the country by the Franks under Clovis, about the year 490, and the conversion of the Franks to the Christian faith, five years after that period.

5. The obscure and distracted history of the Merovingian race, (France being frequently split into small kingdoms,) till its final extinction in the middle of the eighth century.

6. The Carlovingian race, which ascended the throne in the year 752, and was followed, twenty years afterwards, by the celebrated reign of Charlemagne, who carried the power of France to the utmost extent and splendour which it was ever to attain; having, in particular, subdued the greatest part of Germany, where he became the founder and first sovereign of what has since been styled the German empire, A. D. 800, and which remained with his descendants for near a century.

7. The accession of the house of Capet in the year 987.

8. The crusades, in which the French bore the chief sway.

9. The wars with England. The acquisition of France by Henry V, and its deliverance by the Maid of Orleans, or rather by Charles VII, styled the victorious.

10. The reign of Louis XI, who crushing such powerful princes as were left after the English shock, may be regarded as the father of the absolute monarchy.

11. The reign of Francis I, called the father of the arts and letters, during which the French, who had been regarded as barbarians by the more civilized people of Italy, began on the contrary to be distinguished by superior refinement. This is also the first epoch of a standing army in Europe.

12. The intestine commotions with the protestants, and massacre of St. Barthelemy.

13. The reign of Henry IV.

14. That of Louis XIV, too much extolled by the French, and too much degraded by other nations.

15. The recent revolution which has astonished Europe, and which in the singularity and importance of the events, rivals the pages of ancient history.

ANTIQUITIES. Several ancient monuments exist in France which are ascribed to the first epoch. The Greek colony at Marseilles seems to have imparted some degree of civilization to the country, and the rude Gallic coins are evidently an imitation of the Grecian model. Many of them occur in a metal called by the ancients *electrum*, being a native mixture of gold and silver, probably from the ancient mines in the south of France.*

The Roman antiquities in France are numerous, and some of them in excellent preservation. Those at Nismes are particularly celebrated, consisting chiefly of an amphitheatre, and the temple called La Maison Carrè. At Paris there are also some curious remains of Roman architecture, but a mere enumeration of such remains would exceed the limits proposed.

The other periods of French antiquity have been ably illustrated by the learned work of Montfaucon; and the disclosure of the grave of Childeric near Tournay in the last century presented some of the most curious fragments. In an old tower of St. Germain du Pré are representations of several of the first monarchs of the Franks, and many of their effigies were preserved on their tombs at St. Dennis, and other places, till the late revolution.

The monuments of the Carlovingian race are yet more numerous, and Roman mosaics have illustrated the fame of Charlemagne. France has been so little exposed to foreign conquest, or inroad, that several sacred edifices exist which were erected in this remote period. Of the later periods the monuments are so numerous that it would be

* In Picardy, and other parts possessed by the Belgæ, there are circles, and other monuments of the kind, which we call Druidic. Near the town of Carnac on the coast of Vannes in Bretagne, there is a grand monument of this kind, far exceeding Stonehenge, if the account be not exaggerated, which says that there are about four thousand stones, many as high as eighteen or twenty feet, disposed in the form of a quincunx of elven rows. (Monthly Magazine, Feb. 1801.) It is not a little singular that the Veneti, or people of Vannes, who opposed so great a fleet to Cæsar were Belgæ, as Strabo specially informs us, Lib. iv; an additional proof that these monuments are neither Celtic nor Druidic, but founded by the Belgic Goths, who long before the Christian era possessed the greatest part of Europe.

vain to attempt to enumerate them. One of the most singular is the suit of tapestry, which was preserved in the Cathedral church of Bayeux in Normandy, representing the beginning and termination of the grand contest between William and Harold, which led to the conquest of England by the Normans. It is said to have been the work of Matilda, wife of William; and bears every mark of that remote antiquity. The statue of Philip Augustus, in the church of the abbey of Victory near Seules, is no mean relic of the arts of the middle ages; and St. Louis called forth many exertions of ecclesiastic skill. For later periods Montfaucon, and other learned authors, may be consulted.

CHAPTER II.

POLITICAL GEOGRAPHY.

RELIGION.—ECCLESIASTIC GEOGRAPHY.—GOVERNMENT.—LAWS.—POPULATION.—COLONIES.—ARMY.—NAVY.—REVENUES.—POLITICAL IMPORTANCE AND RELATIONS.

RELIGION. THE religion of France was the Roman Catholic, till the recent revolution established freedom of conscience, or rather gave an undue ascendancy to concealed atheism, which any superstition remarkably absurd, has a tendency to produce. But the strongest minds as usual remained deistical, instead of flying from one extreme to another, the accustomed course of men of volatile reflection, and confined knowledge.

ECCLESIASTIC GEOGRAPHY. The ecclesiastic geography of France comprised twenty Archbishopricks, including Avignon; and one hundred and thirty Episcopal sees*. The number of the clergy has been vaguely computed from eighty to four hundred thousand, but the just number seems to have been one hundred and fifty thousand: and in this total, many, no doubt, have been classed who are merely singers in cathedrals, or lay-officers, and servants of the church.

GOVERNMENT. To attempt to describe the present government of France would be as vague as writing on the sands of a troubled ocean, as the whole may be radically changed in the short space that this sheet is at the press. At present the form more nearly approaches that of the Anglo-Americans, than any other, the first consul representing the president of the United States; while the senates, instead of being permanent, are summoned or dismissed at his will, and are ruled by a devoted majority. Equally futile would be the attempt to describe laws, where there is no code; and which fluctuate according to the despotism or clemency of the rulers.

POPULATION. The population of France was formerly computed, as already stated, at 26,000,000, but the recent acquisitions, if durable, would swell it to the formidable extent of 32,000,000. At all events, France is a country teeming with population, and quickly resumes her vigour after stupendous losses, as Europe has repeatedly experienced.

COLONIES. The French colonies are at present unimportant, notwithstanding the addition of the Spanish part of St. Domingo. The best of them have been convulsed and ruined for a season by intestine commotions, arising from the wild theory of the rights of man being

* Young, i. 670.

extended to the negroes, who feel that they have a right to ruin and destroy, but none to build and improve. Perhaps the right of horses may next be discussed; and our race-horses be fastened to the plough, while our coach-horses start for the prize at Newmarket. The intercourse with the remaining colonies is so much obstructed by the English dominion of the sea, that they can hardly be admitted into an estimate of the present situation of France.

ARMY. The political convulsions which have agitated this unhappy country, the enthusiasm, and yet more the despotism of freedom, have occasionally, within these few years, swelled the French armies to the amazing computation of upwards of a million. But it may safely be doubted whether the real amount at any time exceeded 600,000 effective men, the French having swelled the number to intimidate their enemies, and the latter to apologize for their defeats. Under the royal government, the army of France was estimated at 225,000, of which were infantry 170,000, cavalry 44,000, artillery 11,000*.

NAVY. The maritime power of France was formidable even to England, till the battle of La Hogue, since which the British flag has reigned triumphant on the ocean, and the struggles of France, though often energetic, have encountered the fixed destiny of inevitable defeat. So frequent, fatal, and decisive, have been the recent humiliations of the French navy, that hardly the semblance of a warlike fleet could be presented, except by the constrained assistance of Spain. About twenty ships of the line constitute the maritime power of France, being not above one quarter of its former extent. Nor can the loss be easily redeemed, for though ships may be bought or constructed, it must be the labour of many years to form a numerous body of experienced seamen.

REVENUES. The revenue of France was formerly computed at about 30,000,000*l.* sterling: from which, after deducting the expense of collection, and the payment of the interest on the national debt, there remained clear, about 18,000,000. The national debt may be regarded as extinguished; but any attempt to calculate the present state of the revenue must be vague and inconclusive. According to the most recent accounts it amounted to about 600,000,000 livres, or about 25,000,000*l.* sterling.

The common currrent money of France has been computed at 90,000,000*l.* sterling, while that of Great Britain has been estimated at 40,000,000. The late conquests have enriched France, and especially Paris, with the rapine of many provinces; and the generals vie with the Romans in wealth and luxury.

POLITICAL IMPORTANCE AND RELATIONS. The political importance and relations of France continue to be vast; nor was the

* By the Etat Militaire, a calendar revived, for the eighth year of the republic, it appears that the French armies consisted of 110 demi-brigades, each of three battalions, and when complete of 3,200 men: of 30 light demi-brigades of like number: eight regiments of foot artillery, each of 20 companies; eight of horse artillery, each of 466 men: 26 regiments of cavalry, and 20 regiments of dragoons, each of 800 men: 25 regiments of chasseurs, and 12 regiments of hussars of the like number. The whole, without including the engineers, miners, &c. &c. forming a force of 413,728.

prodigious power of this state ever so completely felt and acknowledged, as after a revolution, and a war, which threatened her very existence. When expected to fall an easy prey, she suddenly arose the aggressor, and has astonished Europe by the rapidity and extent of her victories. The rivalry of many centuries between France and England sunk into a petty dispute, when compared with this mighty contest, which will be felt and deplored by distant posterity. Yet by the protection of all-ruling Providence, the British empire rose superior to the struggles, and remained free from those scenes of carnage and devastation, which attended the French progress into other countries: and the French navy being reduced to so insignificant a force, Great Britain has less to apprehend from France, than at any former period. Yet this invaluable advantage is somewhat diminished by the decided preponderance of French power on the continent; particularly in Holland, which formed the grand chain of our commercial intercourse. After all the continental powers have failed, it would be vain to suppose that any one of them, single and detached, can be really formidable to France. And though some thousands of miserable peasants may be at any time induced by foreign gold to form an insurrection in any country, and desperadoes as easily found to conduct them, yet there is little cause to suppose that France would be divided against itself; for the love and admiration of his country, may be pronounced essential passions of a Frenchman, who despises a foreigner while he is under the necessity of requesting his assistance. The distance of Russia, the second if not the first power on the continent, renders her favour or enmity of small importance to France; but between this last country and the Austrian power, lasting jealousy and enmity have subsisted, since the reign of the Emperor Charles V; and a collision of interests in Germany, Swisserland, and Italy have contributed to maintain this rivalry. The envied acquisition of Silesia, and other causes, having likewise excited a rooted hatred between Austria and Prussia, it is natural that the latter country should either conspire with France against the Austrian greatness, or connive at its fall. Yet to a calm and unprejudiced spectator, it might appear the most sound policy for these three great powers to abandon inimical views, and to regard with a general eye of defence and jealousy, the growing, and already exorbitant power of Russia; which may in time consider them as provinces, and overflow Europe with another torrent of barbarism.

CHAPTER III.

CIVIL GEOGRAPHY.

MANNERS AND CUSTOMS.—LANGUAGE.—LITERATURE.—EDUCATION.—UNIVERSITIES.—CITIES AND TOWNS.—EDIFICES.—INLAND NAVIGATION.—MANUFACTURES AND COMMERCE.

MANNERS AND CUSTOMS. THE manners and customs of the French have been so often delineated, that the theme has become trivial and familiar. The most pleasing parts of the portrait are vivacity, gaiety, politeness, a singular disposition towards social enjoyments, and that savoir vivre which enables the adept to dispose of his occupations and pleasures in an agreeable succession, free from listlessness or fatigue. In general Frenchmen regard care as a mortal poison, and study, if possible, to avoid its most distant approach. On the other hand, ancient and recent events conspire to affix a sanguinary stain on the national character, which one would little expect amid so much gaiety and seeming benevolence. The causes of this incongruity might afford an ample subject for philosophical inquiry. Even the violent changes which have taken place, seem to have little affected their characteristic gaiety, and Paris continues to be one of the happiest cities in the world: while the screams of massacre resounded in some parts of the city, in others the theatres were crowded, and nothing was heard but sounds of pleasure.

The ancient and rooted enmity between France and England nourished many prejudices against the French character, which have since disappeared in the reports of more candid authors. Yet, with travellers accustomed to the elegance of English life, many of the French manners and customs cannot be reconciled to ideas of physical purity; and the example of the personal and domestic cleanliness of the English, must still be recommended to imitation. The laws and decency of marriage are also frequently sacrificed; and the looseness of the French morals, in regard to the sex, has become proverbial. A republican form of government has not super-induced republican manners, nor has the liberty of divorce proved any bond of chastity. As every thing continues to be ruled by fashion, it is not unreasonable to hope that even virtue may become fashionable.

While some physicians have attempted to account for English melancholy, from the quantities consumed of animal food, it appears on the contrary, that a Frenchman will devour as much as two Englishmen, disguised, indeed, and modified, so as to beguile and stimulate

the appetite to larger indulgence. In the difference of climate therefore, and in the use of light wines, must be sought the chief physical causes of this discrepancy. The houses of the French often display a strange mixture of magnificence and nastiness; and while even a cottage in England will shew attention to the comforts, conveniences, feelings, and infirmities of human nature, in France the nose may be assailed, while the eyes are enraptured. France has long afforded models of dress to all Europe, nor have the fashions of Paris yet totally lost their fantastic authority. In the frequent and ridiculous allusions to the ancient republics, none of which bore the most distant resemblance of modern France, it was natural that the Grecian and Roman dress should afford models of imitation, and an infallible consequence that the dress would become more elegant. In a country where life itself is an amusement, it is to be expected that the diversions should be infinitely varied. In the capital, theatrical representations bear the chief sway, and every evening about twenty theatres are open and full. Yet these republicans do not rival their favourite Greeks and Romans, in opening theatres and amphitheatres at the expense of the government, an institution worthy of modern imitation, as to afford amusements to the people may frequently save them from finding their own amusements in drunkenness and other low vices.

Language. The French language is the most universally diffused of any in Europe. In variety, clearness, and precision, and idioms adapted to life, business, and pleasure, it yields to no modern speech; but it wants force and dignity, and yet more, sublimity. The critics and academicians of the seventeenth century enacted such severe laws of purity, that, like gold reduced to the utmost fineness, it has become soft and incapable of deep impressions. The French language is a well known corruption of the Roman, mingled with Celtic and Gothic words and idioms. Even in the tenth century it continued to be called Romance; a name which afterwards passed to the poems and tales of chivalry, as being composed in this dialect. One of the earliest specimens of French prose is the history by Villehardouin, which was followed by Joinville's life of St. Louis, and the copious and singular chronicle of Froissart. But while the Italian remains the same from the days of Dante and Petrarca, the epoch of classical purity of the French language commences with the reign of Louis XIV. The recent revolution has introduced such exuberance of new words, and phrases, that a neological dictionary would be required to explain them.

Literature. The literature of France has in modern times excited great respect and admiration. In the bold exertions of inventive genius, and even in profound productions of philosophy, France cannot aspire to vie with Italy or England; but in the pleasing and beautiful paths of invention, and in books of elegant learning and exact science, she remains almost unrivalled. French literature, like that of the other modern countries of Europe, originates with the ecclesiastics, who compiled chronicles and theological productions. Even in the Roman period some authors of respectability appeared in France, as Ausonius, a native of Bourdeaux; Sidonius Apollinaris, and others;

and Severus Sulpitius, author of the life of St. Martin, has been styled the christian Sallust. Nor did the conquest of Gaul by the Franks, break the golden chain of science, which was continued by Gregory of Tours, and other venerable writers. The collection of ancient historians of France, is singularly complete, and important. In the eleventh century the use of the Latin began to be supplanted by the modern dialect. But it would be idle and superfluous to attempt to enumerate the crowd of modern authors, who have reflected honour on their language and country. Who is a stranger to the Roman grandeur of Corneille, to the tender and elegiac elegance of Racine, the tragic pomp and terror of Crebillon, the comic powers of Moliere, the naiveté, the subtle simplicity of La Fontaine, the placid instruction of Fenelon, the gaiety of Gresset, the caustic vivacity of Voltaire?

EDUCATION. The state of education in all the catholic countries was very defective, till the Jesuits acquired great estimation by their attention to this important department; to which, if their exertions had been solely directed, they would have proved a most useful body of men. The want of proper schools for the poor will, it is hoped, be remedied in the new course of things; and to this cause may perhaps be chiefly imputed the want of real and solid information, and of talent for political business, which have surprised the spectators of the French revolution. When the civil commotions in England destroyed all power, except that of knowledge, the number of men of talents, who arose in every department, infinitely exceeds that which the recent events of France have displayed. Nor, as ignorance naturally leads to crime, and the want of education at once darkens and hardens the mind, can this defect be excepted from the causes of the sanguinary events which have appalled Europe. National education has justly attracted the attention of the new rulers, with what success time must discover; for there is a wide difference between forming a plausible scheme, and the putting of it in lasting execution, with regulations and funds that support themselves. Under whatever form of government the ignorant will be found the most unmanageable; and those jacobines who attempted to extinguish what they termed the aristocracy of knowledge, united, as usual, every vice to consummate ignorance.

UNIVERSITIES. France formerly boasted of twenty-one universities; in the north Douay, Caën, Paris, Rheims, Nanci, Strasbourg, in the middle provinces Nantes, Angers, Poitiers, Orléans, Bourges, Dijon, Besançon, and in the south Bourdeaux, Pau, Perpignan, Toulouse, Montpellier, Aix, Orange, Valence*. Of these the Sorbonne of Paris was the most celebrated; but it shewed an irremediable tendency to prolong the reign of scholastic theology. The academies and literary societies were computed at thirty-nine. Those of Paris in particular have been long known to the learned world, by elegant and profound volumes of dissertations on the sciences, and on the Belles Lettres. Nor have public institutions of this kind been foreign to the consideration of the new government.

* La Croix Geographie, Tome i. 279.

CITIES AND TOWNS. The ample extent of this country displays a corresponding number of important cities and towns.

PARIS. Paris, the capital, rises on both sides the river Seine, in a pleasant and healthy situation, with delightful environs. It is divided into three parts; the town, *ville*, on the north, the city in the middle, that part called the university on the south. It is mentioned by Cæsar* as being restricted in his time to an island in the midst of the Seine. An intelligent traveller supposes Paris to be one third smaller than London†: and if so the inhabitants can scarcely exceed 400,000; yet some compute them at more than 600,000. The houses are chiefly built with free-stone, from quarries like catacombs which run in various directions under the streets; so that an earthquake would be peculiarly destructive, and might completely bury the city. The banks of the Seine present noble quays; and the public buildings are not only elegant in themselves, but are placed in open and commanding situations. The Louvre is arranged among the best specimens of modern architecture; and the church of St. Genevieve, now the Pantheon, is also deservedly admired; nor must the Thuilleries, the Palais Royale, and the Hospital of Invalids be forgotten. Paris no doubt exceeds London in magnificence, but yields greatly in cleanliness and convenience; and the streets, generally without accommodation for foot passengers, loudly bespeak the inattention of the government to the middle and lower classes of men. The environs of the Bois de Boulogne, Mont Martre, Passy, St. Dennis, &c. are pleasingly diversified. The recent revolution has little impaired the beauty of Paris; on the contrary the rapine of several provinces has enlarged and adorned the public collections; and by enriching numerous individuals, has enabled them to increase their favourite city with new and beautiful streets and squares.

LYONS. Next to Paris in extent and population was the noble city of Lyons, which was supposed to contain about 100,000 souls. As the chief manufactures were articles of luxury, silk, cloths of gold, and silver, &c. it was natural that this venerable town should be firmly attached to the ancient aristocracy, though with consequences incalculably fatal to its prosperity. During the infatuated reign of the jacobins it was besieged, captured, and after the wildest and basest massacres, was doomed to final demolition. But as there are bounds even to rage and folly, this decree was only executed in part; though Lyons will probably never recover its ancient extent and opulence, for commerce when once expelled seldom returns.

MARSEILLES. The third and fourth cities of France are Marseilles, and Bourdeaux; each peopled by about eighty thousand souls. The foundation of Marseilles has been already mentioned, and the city remains worthy of its ancient fame, the port being at the same time one of the best and most frequented in the whole Mediterranean. The Exchange is a noble building, and the new parts of the city are beautiful.

BOURDEAUX. Bourdeaux was a prosperous city, but the trade must have suffered great injury. The port is ample and commodious.

* vii..54. † Young's France, i. 76.

with extensive quays. The chief exports are wine and brandy, particularly the vin de Bourdeaux, which we term claret, because it is of a clear and transparent red, while tent and some other wines are opake. The theatre is the most magnificent in France, and the actors used to receive extravagant salaries; and as much as London exceeds Paris, so much did Bourdeaux, before the revolution, transcend Liverpool*.

In giving a brief idea of the other chief cities and towns of France, it may be premised that those of the Netherlands, formerly belonging to Austria, are reserved for separate description.

Lisle. But among those which formerly belonged to what was styled French Flanders, may be named Lisle and Valenciennes; the former more memorable for its strength, than for its manufactures of camlets and stuffs. The population is computed at 60,000.

Valenciennes. Valenciennes is also remarkable for the strength of its fortifications; yet on the 26th of July, 1793, it surrendered to the English and Austrian army, under the Duke of York; but was retaken by the French army in the following year. The chief manufactures, lace, camlets, and cambrics.

Amiens. Amiens is a considerable town, with a population of about 40,000; but Rouen, formerly the capital of Normandy, contains 72,000 souls, and carries on a considerable trade. Brest is more remarkable as being the chief maritime arsenal of France in the north, than for its extent of population, which does not exceed 30,000. Nantes, with a population of 56,000, is a beautiful commercial city, with a splendid theatre, and many new streets, but the environs are barren and uninteresting†. Orleans, a city of about 40,000 souls, is celebrated by two sieges which it sustained, one against Attila, king of the Huns, in the fifth century, the other against the English in the fifteenth. The duchy of Orleans has long been the appanage of a branch of the royal line, the revenue having been computed at the enormous sum of about 300,000*l.* sterling. Nanci in Lorrain is not equal to Metz in extent, but is one of the most beautiful cities in France. Strasbourgh is a venerable city, with a population of about 40,000, seized by Louis XIV in 1681, and confirmed to him by the peace of Ryswick in 1697. The fortifications are strong; and the gothic cathedral presents the well-known spire of 574 feet in height.

Toulouse. Few of the other inland towns deserve mention, except Toulouse, a city of 50,000 souls, and the parliament of which was esteemed, under the old government, next in rank to that of Paris: the extent is great, but the manufactures are trifling, though here be the termination of the great canal, opened by Louis XIV, from the Mediterranean to the Garonne, a work truly magnificent, and which alone would preserve his memory to future ages. Montpellier, on the Mediterranean, with delicious and highly ornamented environs, and a noble aqueduct, is of considerable extent, but particularly celebrated by the salubrity of the air, and an ancient school of medicine. The prospect is singularly extensive and interesting, embracing the

* Young, i. 60. † Young's France, i. 104.

Pyrenees, on the one side, and on the other, the yet grander summits of the Alps*.

Edifices. Several of the most noble edifices of France are in Paris, and its vicinity. To those already mentioned must be added the palace of Versailles, rather remarkable however for the profusion of expense, than for the skill of the architect; the parts being small and unharmonious, and the general effect rather idle pomp than true grandeur. The bridge of Neuilé is esteemed the most beautiful in Europe, consisting of five wide arches of equal size, instead of our small side arches which degrade the dignity of such fabrics. The ancient cathedrals and castles are so numerous that it would be idle to attempt to enumerate them; and the French nobility were not contented, like those of Spain, with large houses in the cities, but had grand chateaux scattered over the kingdom, to which, however, they seldom retired, except when compelled by formal banishment from the court.

Inland Navigation. The inland navigation of France has been promoted by several capital exertions. The canal of Briare, otherwise styled that of Burgundy, was begun by Henry IV, and completed by Louis XIII, opening a communication between the Loire and the Seine, or in other words, between Paris and the western provinces. Passing by Montargis is joins the canal of Orleans, and falls into the Seine near Fontainbleau. This navigation of forty-two locks, is of great utility in inland commerce†.

The canal of Picardy extends from the Somme to the Oise, beginning at St. Quintin, and forming a convenient intercourse to the provinces in the north-east.

Canal at Languedoc. But the chief work of this description is the celebrated canal of Languedoc, commenced and completed in the reign of Louis XIV, by Riquet the engineer, under the auspices of that able minister Colbert. Fifteen years of labour were employed, from 1666 to 1681, and the mechanical ignorance of the period was surprised at a tunnel near Beziers, of only 720 feet, lined with freestone. This noble canal begins in the bay of Languedoc; and at St. Ferriol is a reservoir of 595 acres of water: it enters the Garonne about a quarter of a mile below the city of Toulouse. The breadth, including the towing paths, is 144 feet; the depth six feet; the length sixty-four French leagues, or about one hundred and eighty miles. The expense more than half a million sterling.

The other canals in France are very numerous; but, though of supreme utility, are too minute to enter into this general view of the kingdom.

Manufactures and Commerce. For a century, extending from 1650 to 1750, Mr. Young‡ supposes France to have possessed the most flourishing manufactures in Europe; and French writers affect to speak of the English manufactures as being of recent fame. A sketch of this important subject, particularly interesting to Great Britain, as the rival of France, shall here be traced from that well-informed

* Young's France, i. 48. † Philips, 51. ‡ Young's France, i. 569.

author. At Abbeville was a famous manufacture of broad cloth; and another at Louviere in Normandy. At the same place, and at Amiens, were manufactures of stuffs, worsteds, &c. and some of cotton. The manufactures of Orleans were stockings, and refined sugar. At Chateau Roux another manufactory of broad cloths; and in the same neighbourhood large iron forges. At Limoges an hundred looms were employed in weaving druggets of hemp and wool; and the paper mills amounted to seventy. The large woolen manufactory at Cahors had declined; but those of Montauban continued to flourish. At Montpellier were considerable manufactures of blankets and silk handkerchiefs; but those of Nismes were still more important in silk, cotton, and thread: and at Gange was the chief manufacture of silk stockings in all France. The Londrins for the Levant were chiefly made at Beg-de-Rieux, and at Carcassonne. At Pau are large manufactures of linen. Tour has long been celebrated for silks. Beauvais, one of the most active towns in France, supplies tapestries and printed callicoes. The fabrication of plate glass at St. Gobin is well known as the first in Europe. In melting the glass beech wood only is employed, which is supposed to be the chief cause of its superiority over that of England. At St. Quintin are made linen, cambric, and gauzes. Cambrics derive their name from Cambray; and the laces of Valenciennes have been long known. Lisle displays fine cloths and camlets. Mr. Young styles Rouen the Manchester of France, being a town eminent in commerce, and in manufactures of velvet, and cotton cloths; and Caen boasts of her silky fleeces. Bretagne in general has numerous manufactures of thread and linen. The fine cloths made at Louviere our author esteems the first in the world, and at the same place is a large cotton mill. Rheims is remarkable for woolens. The silk manufactures of Lyons were estimated to employ sixty thousand people, the looms being computed at twelve thousand. Iron manufactures flourished at Nantes, Mont Cenis, St. Phillippe-en-foret, and several other places.

From this detail some idea may be formed of the commerce of France, for minute tables of which the reader is referred to Mr. Young's work, from which it appears that the chief imports are raw silk, wool, hemp, soda, and potash, raw hides, tallow, and timber; and the chief exports, manufactured silks, woolens, and linens of various kinds, gloves, skins, soap, oxen, sheep, mules, and above all wines and brandies. By the account for 1784, which did not include the provinces of Lorrain and Alsace, nor the West Indian trade, the statement was

Total exports,	307,151,700 livres.
Total imports,	271,365,000
Balance,	35,786,700 or £1,565,668 sterling.

The trade with the West Indies gave a large balance against France, which in 1786 exported to the amount of more than sixty-

four millions livres, but the imports exceeded one hundred and seventy-four millions. The average imports of France in 1788 were about twelve millions and a half sterling, the exports nearly fifteen millions. The imports of Great Britain in the same year were about eighteen millions, the exports seventeen and a half*. Since the French revolution the commerce of England has been constantly on the increase; while that of our rival has been almost annihilated.

* Young, i. 520.

CHAPTER IV.

NATURAL GEOGRAPHY.

CLIMATE AND SEASONS.—FACE OF THE COUNTRY.—SOIL AND AGRICULTURE.—RIVERS.—LAKES.—MOUNTAINS.—FORESTS.—BOTANY.—ZOOLOGY.—MINERALOGY.—MINERAL WATERS.—NATURAL CURIOSITIES.

CLIMATE AND SEASONS. THE climate of so extensive a kingdom as France, may be expected to be various. In general it is far more clear and serene than that of England; but the northern provinces are exposed to heavy rains, which however produce beautiful verdure and rich pastures*. The author quoted has observed, that rain is seldom so incessant in England, as not to present interruptions in the course of every day; while on the continent it flows unabated. He divides France into three climates, the northern, the central, and the southern. The first yields no wines; the second no maize; the third produces wines, maize, and olives. These divisions proceed in an oblique line from the south-west to the north-east, so as to demonstrate "that the eastern part of the kingdom is two and a half degrees of latitude hotter than the western, or if not hotter more favourable to vegetation." The central division Mr. Young considers as one of the finest provinces in the world, containing among others the province of Touraine, which the French particularly celebrate, yet it is exposed to violent showers of hail. The chief disadvantage of the third climate is the flies. "They are the first torments in Spain, Italy, and the olive district of France: it is not that they bite, sting, or hurt, but they buz, teaze, and worry: your mouth, eyes, ears, and nose, are full of them: they swarm on every eatable, fruit, sugar, milk, every thing is attacked by them in such myriads, that, if they are not driven away incessantly by a person who has nothing else to do, to eat a meal is impossible." One great advantage of the climate of France arises from its being adapted to the culture of the vine, which flourishes in spots that would otherwise be waste.

FACE OF THE COUNTRY. The face of the country is generally plain; and the only mountains deserving of the name are found in the south, in Auvergne and Languedoc, Dauphiné and Provence. Brittany corresponds greatly in appearance with Cornwal, and abounds in extensive heaths. In Lorrain are found the mountains of Vosgès, far inferior to the southern elevations. For beauty Mr. Young prefers the

* Young's France, i. 309.

Limosin to any other province of France; yet much of the kingdom is finely diversified with hill and dale, and the rivers, particularly the Seine, are often grand and picturesque.

SOIL AND AGRICULTURE. The variations of the soil have been ably illustrated by the same skilful farmer*. The north-east part from Flanders to Orleans is a rich loam. Further to the west the land is poor and stony; Brittany being generally gravel, or gravelly sand, with low ridges of granite. The chalk runs through the centre of the kingdom, from Germany by Champagne to Saintonge; and on the north of the mountainous tract is a large extent of gravel, probably washed down in primeval times; but even the mountainous region of the south is generally fertile, though the large province formerly called Gascony presents many *landes*, or level heaths.

The same writer has ably illustrated the defects of French agriculture, which cannot be more effectually exposed than in his own words. "In order the better to understand how the great difference of product between the French and English crops may affect the agriculture of the two kingdoms, it will be proper to observe that the farmer in England will reap as much from his course of crops, in which wheat and rye occur but seldom, as the Frenchman can from his, in which they return often.

An English course.		A French course.	
1, Turnips		1, Fallow	
2, Barley		2, Wheat	12
3, Clover		3, Barley, or oats	
4, Wheat	25	4, Fallow	
5, Turnips		5, Wheat	18
6, Barley		6, Barley, or oats	
7, Clover		7, Fallow	
8, Wheat	25	8, Wheat	18
9, Tares, or beans		9, Barley, or oats	
10, Wheat	25	10, Fallow	
11, Turnips		11, Wheat	18
	75		72

"The Englishman in eleven years gets three bushels more of wheat than the Frenchman. He gets three crops of barley, tares, or beans, which produce nearly twice as many bushels per acre, as what the three French crops of spring corn produce. And he further gets at the same time three crops of turnips and two of clover, the turnips worth 40*s.* the acre, and the clover 60*s.*; that is 12*l.* for both. What an enormous superiority! More wheat; almost double of the spring corn; and above 20*s.* per acre, per annum, in turnips and clover. But further; the Englishman's land, by means of the manure arising from the consumption of the turnips and clover, is in a constant state of improvement; while the Frenchman's farm is stationary. Throw the whole into a cash account, and it will stand thus:.....

* Young's France, i. 296.

English System,				French System.			
Wheat 75 bushels at 5s.	£18	15	0	Wheat 72 bushels at 5s.	£18	0	0
Spring corn three crops at 32 bushels, 96 bushels, at 2s. 6d.	12	0	0	Spring corn, three crops at 20 bushels, 60 bushels at 2s. 6d.	7	10	0
Clover, two crops	6	0	0				
Turnips, three crops	6	0	0				
	42	15	0		25	10	0
Per acre, per annum	3	17	8	Per acre, per annum	2	6	4

" In allowing the French system to produce twenty bushels of spring corn, while I assign thirty-two only to the English, I am confident that I favour the former considerably; for I believe the English produce is double of that of France: but stating it as above, here are the proportions of forty-two on an improving farm, to twenty-five on a stationary one; that is to say a country containing 100,000,000 acres produces as much as another whose area contains 168,000,000, which are in the same ratio as thirty-six and twenty-five*." For ample and numerous illustrations of the defects of the French system, the reader is referred to the same useful publication. In some of the provinces, however, the plans of agriculture correspond with the natural fertility of the soil; and others display a most laudable industry. A striking instance of the latter is the artificial fertility conferred on some of the barren mountains of the Cevennes†. As the waters which run down the sides carry considerable quantities of earth into the ravines, walls of loose stones are erected which permit the waters to pass when they are clear; but when turbid their load of earth is gradually deposited against the wall, and affords a space of fertile soil. Successive ramparts are thus erected to the very top of the mountain; and the water, having no longer a violent fall, only serves to nourish the crops, which are moreover protected by planting fruit trees at certain intervals, so as to lend security and consistence to the new acquisition. By another process, calcareous mountains, which generally rise in shelves, are rendered productive by cutting away the rock behind the shelf, which supplies materials for a low wall around the edge. The interval is afterwards filled with earth, and the barren mountain is crowned with luxuriant terraces.

Rivers. The rivers of France form the next object of consideration; and among these four are eminent, the Seine, the Loire, the Rhone, and the Garonne.

Seine. The first is one of the most beautiful streams of France, rising near Saint Seine, in the modern department of Côte D'Or, a portion of ancient Burgundy, it pursues its course to the north-west, till it enters the English Channel at Havre de Grace, after a course of about 250 English miles. It may here be remarked that the length assigned to rivers is not calculated with exactness, a work of infinite and uncertain labour, but merely affords a comparative scale, to judge of the relation, which the course of one river bears to another.

* Young's France, i. 357. † Nicholson's Journal, iii. 295.

LOIRE. The Loire derives its source from Mont Gerbier in the north of ancient Languedoc; and after a northern course turns to the west, entering the ocean a considerable way beyond Nantes, after a course of about 500 miles.

RHONE. The Rhone springs from the Glacier of Furca, near the mountain of Grimsel in Swisserland; and after passing the beautiful vales of the Vallais, and the lake of Geneva, bends its course towards the south, and enters the Mediterranean. The comparative course 400 miles.

GARONNE. The Garonne rises in the vale of Arau in the Pyrenees. The course of this river is generally north-west. It extends to about 250 miles. After its junction with the Dordogne, it assumes the name of the Gironde.

The Seine is almost universally pleasing and picturesque; and the Loire presents noble features from Angiers to Nantes, but the rest of its immense course is disfigured with rough gravel*. The Garonne generally pervades a flat country, and is tamely fringed with willows. The Rhone is a noble and rapid stream.

France is adorned and enriched with many rivers of smaller course, and reputation; as the Saone which joins the Rhone near Lyons; the Lot and Dordogne which join the Garonne; and the numerous tributary streams of the Loire. The uncertainties of time and war as yet prevent the geographer from regarding the Meuse and Moselle, and even the Rhine, as rivers of France.

LAKES. A few small lakes occur in Provence, and perhaps in some of the other provinces, but only adapted to the minute description of the topographer, France and Spain being singularly deficient in this pleasing feature of landscape.

MOUNTAINS. Before proceeding to the grand chain of mountains in the south of France, it may be proper briefly to mention a few mountainous tracts in the north. Those of Brittany are granitic and primitive, but like those of Cornwal, of small elevation. They divide into branches towards Brest and Alençon. The Vosges†, in the department of that name, in the south of ancient Lorrain, are supposed to be connected with the mountains of Swisserland‡.

MONT JURA. Mont Jura, a vanguard of the Alps, forms a boundary between France and Swisserland. If Mont Blanc be admitted among the French mountains, the other Alps cannot rival its supreme elevation. The ancient province of Dauphiné displays

* Young's France, i. 305.

† The mountains of Vosges, and the district to the east, are by the Germans called the Hundsruck. If the French extend their boundaries to the Rhine, this interesting portion of Germany will form a valuable accession, including not only a great part of the Palatinate, with the cities of Mentz, Wurms, and Spire, but the countries of Simmern, Sponheim, Oberstein, Birkenfeld, and Zweybrucken, constituting the important duchy of that name, more generally called Deux Ponts, supposed to contain 180,000 inhabitants, and yielding a revenue of 500,000 florins. Considerable chains of mountains appear on the west and east of Deux Ponts, remarkable for mineral productions, especially mercury, and beautiful agates.

‡ Lameth. Theo. de la Ter. iv. 384.

several alpine branches, which also extend through great part of Provence.

CEVENNES. To the west of the Rhone arises the grand chain of the Cevennes, which have been described by a recent author*. He observes that the Cevennes seem the principal centre of the primitive mountains of France, extending into several branches. The principal branch runs along the river Ardeche towards Ales. 2. Another traverses the Rhone on the side of Tournon and Vienne, towards the plains of Dauphiné. 3. That forming the mountains of Beaujolois, passing by Terare, Autun, &c. till it be lost at Avalon. This branch is about 70 leagues in length, but in breadth sometimes not more than a league: it contains the copper mines of Chesi and St. Bel, and some lead mines. Coal is also found in the declivities. 4. The branch which, separating the bason of the Loire from that of the Allier, forms the mountains of Forez. It passes Roanne on the one side, and Thiers on the other, and is lost towards St. Pierre le Moutier. The plain of Montbrisson is bounded by these third and fourth granitic branches. 5. That which, separating the bason of the Allier from that of the Cher, passes by Clermont to Montluçon. 6. That stretching towards Limoges. 7. That from the Dordogne towards the Charente. 8. That dividing the Dordogne from the Garonne.

This account is not a little confused, as here are abundant branches without one trunk. The grand chain of the Cevennes seems to run from north to south, and to send out branches towards the east and west. In the modern departments of the upper Loire and Cantal, are appearances which, in the opinion of eminent naturalists, indicate ancient volcanos; but as these supposed appearances consist chiefly of basaltic columns, and elevations, the best judges consider them as having no claim to a volcanic origin. This subject remains dubious. The assumed lavas may be particular stones in a state of decomposition. Yet the numerous existing volcanoes in South America, supposed by many to have been a more recent continent, will compel the impartial inquirer, who will shun any exclusive system, to allow that many extinct volcanos may exist; but he never will grant that basaltic columns afford the smallest presumption of a volcano, as they rarely appear in the neighbourhood of existing volcanos, and are sometimes found resting on coal, which in case of fire must have been totally consumed. The rocks of Puy, Axpailli, and Polignac, rise in sudden and grotesque forms; but these appearances are sometimes assumed even by granite, as may be observed in Cornwal. The basaltic mountains of the ancient province of Auvergne are likewise too extensive to be produced by a single volcano, and a chain of volcanos would be too bold even for conjecture. The northern part of the chain is styled the Puy de Dome, while the southern is called that of Cantal†. The Monts D'Or form the centre, and are the highest mountains in France. The chief elevation is that of the Puy de Sansi, which rises about 6,300 feet above the level of the sea, while the Puy de Dome is about 5000, and the Plomb du Cantal, the highest of that part, is about 6,200 feet.

* Lameth. Theo. de la Ter. iv. 384.
† Voy. dans les depart. Cantal, p. 5.

Near the Puy de Sansi is l'Ango, that gigantic mountain, and Ecorchade a shattered and wrecked elevation. The Plomb du Cantal is also accompanied by bold rivals, as the Puy de Griou, le Col-de-Cabre, le Puy Mari, and the Violent. This enormous assemblage of rocks covers an extent of about 120 miles, and according to the French authors is chiefly basaltic. The Puy de Sansi is capped with almost perpetual snow, followed in the descent by naked rocks and ancient pines: from its side issues from two sources, the river Dordogne, and many picturesque cascades devolve amidst basaltic columns*. On the 23d of June, 1727, Pradines, a village on the slope of one of these mountains, was totally overwhelmed by its fall, the whole mountain with its basaltic columns rolling into the valley. The inhabitants were fortunately engaged in the celebration of Midsummer eve, around a bonfire at some distance†. These mountains are in winter exposed to dreadful snowy hurricanes, called *acirs*, which in a few hours obliterate the ravines, and even the precipices, and descending to the paths and streets, confine the inhabitants to their dwellings, till a communication can be opened with their neighbours, sometimes in the form of an arch under the vast mass of snow. Wretched the traveller who is thus overtaken. His path disappears, the precipice cannot be distinguished from the level; if he stand he is chilled, and buried if he proceed; his eye-sight fails amidst the snowy darkness; his respiration is impeded; his head becomes giddy, he falls and perishes. In summer, thunder storms are frequent and terrible, and accompanied with torrents of large hail, which destroy the fruits and flocks, which for six months pasture on the mountains, guarded by shepherds, who have temporary cabins of turf and reed, styled *burons*.

Pyrenees. The Pyrenees remain to be described. This vast chain, known and celebrated since the days of Herodotus, may be considered with equal justice as belonging either to France or to Spain; but as the most productive and interesting parts are on the side of France, and her literati have exerted themselves in the description, while those of Spain have been silent, it seems at least equally proper to introduce the delineation here, which shall be chiefly derived from the recent accounts of Ramond and Lapeyrouse‡. To the surprise of naturalists, the Pyrenees have been found to present calcareous appearances, and even shells, near, or upon their highest summits, which are in the centre of the chain. Mont Perdu is considered as the highest elevation of the Pyrenees, ascending above the sea 1751 French toises, or about 11,000 feet English. The Canigou formerly usurped that honour, though it exceed not 1440 toises. Other noted heights are Tuccarroy, Marboré, the pic de Midi, the pic d'Arni, the Niege Veille, the Vigne Male, La Breche de Roland, &c||. The Pyrenean

* Voy. dans les depart. Cantal, p. 13.

† Ibid. p. 24. One vast block of stone, ninety feet long and twenty-six thick, being too heavy to roll, sunk vertically, and the shock seemed an earthquake even at the distance of a league. Another mountain is said to have recently sunk and disappeared in the south of France.

‡ Journal des Mines, No. 37. p. 35.

|| See in the same Journal, No. 46. p. 757, an estimate of other Pyrenean elevations.

chain appears at a distance like a shaggy ridge, presenting the segment of a circle fronting France, and descending at each extremity till it disappears in the Ocean and Mediterranean*. Thus at St. Jean de Luz only high hills appear, and in like manner on the east, beyond the summit Canigou, the elevations gradually diminish. The highest summits are crowned with perpetual snow. Blocks of granite are interspersed with vertical bands, argillaceous and calcareous, the latter primitive or secondary, and supplying the marbles of Campan and Antin, of beautiful red spotted with white, though the general mountain mass be grey. To the south and west, the Pyrenees present nothing but dreadful sterility; but on the north and east, the descent is more gradual, and affords frequent woods and pastures. Besides the dreadful fall of rocks, undermined by the waters, they are exposed to Lavanges, or the impetuous descent of vast masses of snow, called Avalanches in Swisserland, and have their glaciers and other terrific features of the Alps.

Mont Perdu. According to Ramond†, the very summit of Mount Perdu abounds with marine spoils, and must have been covered by the sea; an observation confirmed by Lapeyrouse. This mountain is of very difficult access, as the calcareous rock often assumes the form of perpendicular walls, from 100 to 600 feet in height; and the snows, ice, and glaciers, increase the difficulty; nor did these naturalists attain the summit, though they could observe that the rock corresponded in form and nature, with those which they ascended. A singular feature of the Pyrenees consists of what are called *houles*, or walls disposed in a circular form. Near the summit of Mont Perdu is a considerable lake, more than 9000 feet above the level of the sea, which throws its waters to the east, into the Spanish valley of Beoussa; and which the travellers consider as a proof that Mont Perdu really belongs to Spain, and that Tucarroy forms the boundary. The best maps of the Pyrenees are erroneous, as this lake has no connection with the noted cascades of Marboré, which flow from another lake to the west; and Lapeyrouse has pointed out other gross mistakes in the topography of this interesting district. He adds, that it is probable that the sole access to the summit of Mont Perdu will be found on the side of Spain, there being three summits called by the Spaniards *Las Tres Sorellas*, or the Three Sisters; the highest being to the north, and the lowest on the south, but separated, as would appear, by large glaciers. From this view of the Pyrenees, Lapeyrouse concludes that there exist chains of mountains, in which bands of granite, porphyry, trap, hornblende, and petrosilex, alternate vertically with primitive limestone, and are so intermingled as to prove a common origin. But in the Pyrenees these bands are surmounted by secondary limestone, replete with marine spoils, and containing even skeletons of animals, so that he concludes that the highest mountains of the chain must have yielded to the fury of the ocean, and that the secondary parts alone now exist. Mr. Townsend‡ observes, that the limestone and schistus feed the vegetation on the north of the Pyrenees, while the

* Voy. dans les Dep. No. 67, p. 4.
† Journ. des Min. ut supra. ‡ Spain, i. 89.

south is barren, and consists of granite; while, in fact, mountains are generally barren and precipitous on the south and west, because the most violent rains and tempests come from those regions. Yet this brief account of the Pyrenees must be closed with the observation, that while Saussure has explained with sedulous skill, the substances which compose the Alps, there is no work concerning the Pyrenees of great research, or patient investigation.

Forests. The forests of France are numerous and extensive: and as wood is the general fuel, attention to their growth becomes indispensable. Two of the most remarkable are those of Orleans and Ardennes, the former for extent, and the numerous banditti who used to infest its precincts: the latter for ancient fame, and events of chivalry. The forest of Ardennes extended from Rheims to Tournay, and on the north-east to Sedan in the present department of the Ardennes. To these names might be added the forest of Fontainbleau, and many others, which here to enumerate would be superfluous, as almost every seigneur had his forest, in which he passed the greatest part of his life among his brethren the wild beasts*.

Botany. Notwithstanding the pains that have hitherto been bestowed by French naturalists in illustrating the flora of their native country, it still remains in an imperfect state: particular districts, as the environs of Montpellier, of Lyons, and of Paris, have been surveyed with considerable accuracy, but many chasms must yet be filled before a comprehensive history can be made out of the vegetable productions of France. So great indeed is its extent, and so various its climate, that probably more than half the European species of plants may be found within its boundaries. The bleak shores of the north, the fertile plains on the Belgian frontier, the rich vales of the Loire, the Rhone, and Garonne, the towering heights of Auvergne, the exterior ridges of the Alps and Pyrenees, the sunny exposure of the Mediterranean coast, offer such striking differences of soil and temperature, as evince at once a most abundant catalogue of indigenous plants. That country which produces in full and equal perfection wheat and apples, maize and grapes, oranges and olives, the oak and the myrtle, must doubtless exceed all other European countries of equal extent, in the variety and richness of its vegetable treasures. A bare enumeration of them would occupy more room than can be allotted to them, in a work like the present. We shall therefore only particularize such as are the most generally interesting to the English reader.

If France be divided by imaginary lines from east to west into nearly four equal parts, the most northern of these divisions will bear a considerable resemblance in its climate and vegetable produce to the south of England; the second differs principally from the first, in exhibiting here and there, a few vineyards; in the third, fields of maize begin to make their appearance; and the fourth is distinguished from the preceding, by intermixing groves of olive trees with its exuberant harvests, and its overflowing vintages.

* William of Malmsbury says, that Rufus, the son of the Conqueror, established many forests and abodes for the wild beasts "whom he loved as if he had been their father."

The southern and eastern provinces of France, being those which have been the most carefully explored, as well as containing the most interesting plants, are chiefly referred to in the following list:

The species belonging to the large family of compound flowers, including nearly the whole of the class *Syngenesia* of Linnæus, are very numerous. Of these, several are introduced at present into our flower gardens; such are Echinops sphærocephalus, *globe thistle;* Onopordon Illyricum, *woolly thistle;* Carlina corymbosa, racemosa, and lanata, all three species of the *Carline thistle;* and natives of *Provence;* Atractylis cancellata, *distaff thistle;* several species of Centaurea, among others C. benedicta, *blessed thistle;* Santolina incana, *lavender cotton;* Artemisia rupestris, *mountain southernwood*, and A. abrotanum, *common southernwood*, both of them plentiful on the rocks of Dauphiné and Provence. Tussilago and Cacalia alpina, *alpine Coltsfoot and Cacalia*, abounding on the mountainous frontiers of Savoy and Piedmont; Catananche cærulea and lutea, *blue and yellow Lion's foot;* Aster Alpinus and amellus, *Michaelmas daisy*. A few esculent vegetables that grow wild in Languedoc and Provence, but are cultivated in our kitchen gardens, arrange themselves under this class; for instance, Cynara scolymus, *artichoke;* Tragopogon porrifolium *salsafy;* and Scorzonera Hispanica, *scorzonera*. Two or three are used in medicine, such as Tanacetum balsamita, *costmary;* Arnica montana, *leopard's-bane;* Anthemis pyrethrum, *pellitory of Spain*, found in the neighbourhood of Montpellier.

The cucumber, the melon, the gourd, and other kindred genera, though cultivated largely and with great ease in the South of France, are yet natives of hotter climates; only one of this natural family, the Momordica elaterium, *squirting cucumber*, properly belongs to the French flora; it occurs in a truly wild state, on low loose rocks, in Provence and Languedoc.

Of the ringent or galeated plants, numerous species are natives of France, not many of which, however, have found their way into English gardens; the following are almost the whole that are in any request for their beauty or use, all of which are natives of Languedoc, Provence, or Dauphiné. Acanthus spinosus, and mollis, *prickly and smooth acanthus;* Antirrhinum Monspessulanum, *Montpellier snapdragon;* Pedicularis flammea and incarnata; Origanum Creticum, *Cretan origany;* Melissa officinalis, *baum;* Hyssopus officinalis, *garden hyssop;* Lavandula stœchas, *spike lavender;* Rosmarinus officinalis, *rosemary;* and Salvia officinalis, *garden sage*.

The nearer in general any country is situated to the tropics, the greater is the abundance and beauty of the bulbiferous or liliaceous plants that inhabit it: the south of France is particularly rich in these splendid and fragrant vegetables, several of which have been naturalized in our gardens, and constitute their principal ornament. Of the genus Allium, *garlic*, no less than thirty-six species are natives of France, several of which have been admitted for their beauty into English flower gardens, of these the A. Monspessulanum, *Montpellier garlic*, is perhaps the chief. The large *branched Asphodel*, Asphodelus ramosus, a flower of great beauty and poetic fame, is by no means uncommon in Provence. Hemerocallis fulva, *tawny day-lilly;* Hyacinthus botryoides, *clustered hyacinth;* Ornithogalum pyramidale, *spiked star of Bethlehem*,

are all found in the Mediterranean provinces of France, as are also Lilium bulbiferum, pomponium, and martagon, the *orange*, *pompadore*, and *martagon lilies*; Erythronium dens canis, *dog's-tooth violet*; Bulbocodium vernum, *vernal bulbocodium*; Veratrum album, *white hellebore*; Narcissus poeticus and Jonquilla, *Narcissus* and *Jonquil*. The shore of Hieres is adorned by the Pancratium maritimum, *sea daffodil*, growing luxuriantly on the very beach; and on the lower cliffs of the Nicene and Genoese Alps, the gigantic Agave, *American aloe*, now naturalized to the soil and climate, raises her stately flower stem to the height of twenty or thirty feet, and looks down on every herbaceous plant of European origin.

Allied to the bulbiferous, are the tuberous rooted plants, with sword-shaped leaves, several species of which are found in France; the most beautiful and worthy of notice are Gladiolus communis, *corn flag*; abundant in the cultivated lands of the middle and southern provinces; the Iris Germanica, *large purple fleur de lis*, in Alsace and on the German frontier; and Iris pumila and maritima, *dwarf and sea fleur de lis*, two elegant little plants that are occasionally met with in Provence and Languedoc.

Of the papilionaceous plants that are natives of this country, several deserve notice for their use or ornament. Lathyrus tuberosus, a vegetable of the pea kind, grows wild in Alsace, and is cultivated in many parts of France for its large esculent tuberous roots; Lupinus varius, the *great lupin*, varying with blue, white, or flesh coloured blossoms, and Cicer arietinum, *chick pea*, are met with in the southern provinces growing spontaneously, but are more frequently cultivated in large fields as food, both for cattle and man; in England, the former is considered merely as an ornamental plant, and is found in every flower-garden. Trigonella fœnumgrecum, *fenugreek*, esteemed for its medicinal virtues, and Astragalus tragacantha, *tragacanth vetch*, so named from the gum that it yields, are both natives of Provence, and the vicinity of Montpellier. Many of our most ornamental shrubs belong to this class, such as Cytisus Laburnum, *great Laburnum*; Cytisus nigricans, *black cytisus*; Colutea arborescens, *bladder senna*; Anagiris fœtida, *stinking bean trefoil*, and Spartium junceum, *Spanish broom*.

Several succulent plants of the same natural class with the Sedum, are found on the dry rocks on the Spanish and Swiss frontiers; of which a few have been introduced into our gardens, viz. Sedum anacampseros and villosum, *ever-green orpine*, and *hairy sedum*; Sempervivum, globiferum, and arachnoideum, *hen and chicken sedum*, and *cobweb sedum*.

The class Pentandria of Linnæus contains several well-known plants that occur native in France, some of which have been introduced into our gardens and shrubberies; such are Primula villosa and auricula, *hairy primrose* and *auricula*; Androsace maxima and carnea, *greater* and *flesh-coloured Androsace*, all found wild on the mountains of Provence; Lonicera cœrulea, *blue berried honey-suckle*; Lycium Europæum, *box-thorn*; Nerium oleander, *rosebay oleander*; Campanula grandiflora and speculum, *great flowered campanula* and *Venus's looking glass*; Rhamnus paliurus and alaternus, *Christ's thorn* and *alaternus*; Tamarix Gallica and Germanica, *German* and *French tamarisk*. Others of this class

deserve notice for their use in various arts, and in medicine, as Pistachia terebinthus, *Chio turpentine tree*, P. lentiscus, *mastich tree*; Celtis australis, *nettle tree*; Rhamnus infectorius, the berries of which are used in dyeing, by the name of *French berries*, or *graines d'Avignon*; Anchusa tinctoria, *alkanet*, another dyeing drug; Rhus cotinus and coriarea *common* and *Venetian sumach*, the most powerful vegetable astringents, and largely applied to leather-dressing and dyeing; Salsola soda, *glass wort*, a plant growing on the shores of the Mediterranean, from which the Barilla of commerce is prepared. Some esculent plants also belong to this class, which, if not strictly natives of France, have at least been long naturalized to the soil and climate; these are Ceratonia Siliqua, *carob tree*; Pistachia Narbonnensis, *pistachia nut tree*; Rhamnus zizyphus, *jujube tree*.

But few species of the French flora need be mentioned under the class Decandria Linn. The *fraxinella*, Dictamnus albus; the *yellow* and *Narbonne flax*, Linum flavum and Narbonnense: the *sweet William*, *Deptford pink*, and *carnation*, Dianthus barbatus, armeria, and caryophyllus; the *ferruginous Rhododendron*, R. ferrugineum; and *the Strawberry saxifrage*, Saxifraga cotyledon, are adopted into our flower gardens: the *Rue*, ruta graveolens; and *Storax tree*, Styrax officinalis, the former a native, and the other naturalized at Hieres, are used in medicine.

Many of the most beautiful plants of the classes Polyandria and Icosandria are to be met with wild in France; such are Chelidonium corniculatum, *scarlet horned poppy*; Pæonia officinalis and tenuifolius, *common* and *narrow-leaved peony*; Ranunculus aconitifolius, *mountain ranunculus*; Adonis autumnalis, æstivalis, and vernalis, *pheasant's eye*; Thalictrum aquilegifolium, *feathered columbine*; Aquilegia alpina, *mountain columbine*; Nigella damascena and arvensis, *fennel-flower*; Helleborus niger and hyemalis, *Christmas rose* and *winter aconite*; Anemone alpina, hortensis, and hepatica, *Alpine* and *scarlet anemone* and *hepatica*; Delphinium elatum, *Bee larkspur*; Aconitum napellus, *monks-hood*; several trees and shrubs both ornamental and useful, also arrange themselves under one or other of these classes. Myrtus communis, the *broad leaved myrtle*, grows with great luxuriance along the whole of the Mediterranean coast; Capparis spinosa, the *Caper-bush*; Cistus laurifolius and Monspeliensis, the *laurel leaved* and *Montpellier cistus*; three low shrubs of exquisite beauty, hang from the summits, or cluster round the sides of the low rocks about Toulon, and Montpellier. In the same vicinity also are found Rosa Gallica, the *Provence rose*; Mespilus pyracantha, the *pyracantha*, and Punica granatum, the *pomegranate tree*.

A few trees and shrubs remain to be mentioned, which will be more conveniently taken together, than separated into their botanical classes; these are quercus ægilops, and cerris, the *greater* and *less prickly-cupped oak*, two very fine species that are found in plenty about Paris and Fontainbleau; quercus coccifera, suber, and ilex, the *kermes oak*, *cork tree*, and *evergreen ilex*, growing chiefly in the southern provinces; juniperus sabina, oxy-cedrus, and phœnicea, the *savine*, the *brown* and *yellow berried juniper*; osyris alba, *poet's cassia*; phyllyrea latifolia, and angustifolia, *broad* and *narrow leaved phillyrea*; and erica

arborea, *tree-heath*; all of them natives of Provence, Dauphiné, and Languedoc.

Zoology. The horses of France do not appear to have been celebrated at any period; and it is well known that the ancient monarchs were drawn to the national assemblies by oxen. Before the late commencement of hostilities, many English horses were imported for the coach and saddle. The best native horses are, for draught, those of Normandy; for the saddle, those of the Limoçin, which have been recently improved by crossing the breed with the Arabian, Turkish, and English*. But the greater number of horses in France consists of Bidets, small animals of little shew, but great utility. The rich pastures of the north, support numerous herds of cattle, yet an able judge† asserts that there is not in the kingdom one tenth part of what there ought to be; a radical error of French agriculture being the neglect of grass, and the consequent want of manure. The cattle of Limoges, and some other provinces, are of a beautiful cream colour. The beef at Paris Mr. Young prefers to that of London. The sheep are ill managed, having in winter only straw, instead of green food as in England.‡ The consequences are poor fleeces, rarity of sheep, so that the poor are forced to eat bread only, and large quantities of wool are imported. Of ferocious animals, the most remarkable are the wild boar and the wolf; the ibex, rock goat, or bouquetin, is found on the Pyrenees and the Alps, being a large goat with very long and strong horns. The chamois belongs to the class of antelopes, having small strait horns. Among the animals almost peculiar to France, may be mentioned the Vespertilio serotina, Pipistrilla, Barbastella, the Otis tetrax, the Chadrius lutreus &c.

Mineralogy. Gold mines anciently existed in the south of France, and some of the rivulets still roll down particles of that metal. The ancient Gallic coins are, however, of a base gold mingled with silver, being the metal styled by the ancients, electrum. And such it is probable are the particles of gold which are found in the sands of the Rhone, between Tournon and Valance, and in those of the Ardéche.‖ France can, however, boast of the silver mines at St. Marie-aux-Mines in Alsace, and at Giromagny in the department of the Upper Rhine, near the mountains of Vosges, also a part of ancient Alsace. The same district contains mines of copper, a metal not unfrequent in the departments of the Alps, and those of the Loire, the Lozere, and the Ardéche. Some appearances indicate tin in Bretagne, and even in the centre of France. Two-thirds of the lead of France are from Bretagne, particularly the mines of Poullaoven and Huelgoet; mines of lead also occur in the maritime Alps, and in the mountains of Vosges, in the departments of Lozere, Ardéche, &c. &c. Antimony occurs in the Ardéche, and in the department of the Allier, at Allemont in former Dauphiné, and in that of Mont Blanc, if that acquisition subsist. There are noted mines of calamine near Aix la Chapelle, if this may be considered as French territory. Manganese occurs in the department of the Loire, and in that of the Vosges; and at Romaneche, in the department of the Saone, and Loire; it is also found near Perigou, whence it used to be called Pierre de Perigord:

* Young's France, ii. 55. † Ibid. ii. 52. ‡ Ibid. i. 430.
‖ Journ. des Mines, Ann. vi. p. 662.

cobalt is another product of Alsace. The new acquisitions in Savoy present some mercury; and there is a mine at Menildot.*

Iron. Iron, that most important and universal of metals, is found in abundance, particularly in some of the northern departments. In 1798 it was computed that there were two thousand furnaces, forges, &c., for the working of iron and steel.†

Coal. The coal mines of France were at the same time estimated at four hundred, constantly wrought; and two hundred more capable of being wrought. Of these coal mines many occur in the provinces which formerly belonged to Flanders, and in the departments of Boulogne, and Lamanche. Coal is also not unfrequent in the centre and south of France. Nearly allied to coal, is jet, an article formerly of great consumption, chiefly in Spain, where it was made into rosaries, crosses, buttons for black dresses, &c.‡ France was from time immemorial in possession of this branch, which was centered in three villages in the department of the Aude, in the south-west of ancient Languedoc. In 1786 it employed more than twelve hundred workmen; and the annual supply of the mineral was computed at a thousand quintals, or hundred weight. Besides exports to Germany, Italy, and the Levant, Spain imported these jet manufactures to the annual amount of 180,000 livres. Latterly, jet was in return, imported from the mines of Arragon in Spain, to supply this manufacture. That in the south of France is in beds like coal, but not contiguous, and was sometimes rendered impure by a mixture of pyrites: it is commonly found in a kind of rusty earth, of an ash colour; and sometimes occurs in masses of the weight of fifty pounds, about five or six fathoms under the surface.

Besides excellent free-stone, the environs of Paris contain abundance of gypsum, which at Mont Martre is found curiously crystallized. Alum

* The duchy of Deux Ponts, a valuable acquisition of France on the west of the Rhine, has long been celebrated for mines of quicksilver. The mountains of Vosges are chiefly horizontal strata of red sand-stone. Near Gelheim, to the west of Wurms, the chain is interrupted; but afterwards rising, spreads in two branches, that to the west being called Westrich, that to the east Donnersberg. (Journal des Mines, No. 6. p. 70.) The mountains which contain the mercury embrace a district of ten or twelve leagues in length, south to north, from Wolfstein to Cruznach, and seven or eight leagues in breadth, being of a reddish brown, or gray sand-stone. In this territory, among numerous mines of quicksilver, are those of Stahlberg, and Donnersburg, which have been explored for many centuries. The gangart is steatite, barytes, argillaceous rock, &c. The adjacent part of the Palatinate also contains similar mines, particularly in the mountain of Potsberg near the river Glan, composed of a kind of substance like kaolin, of minute particles of quartz, mica, and clay. The pits in Potsberg are about forty. At Wolfstein are other mines of the same rare mineral. The annual product of these mines may be estimated at 67,200 pounds of mercury; and the revenue, after deducting expenses, at 127,517 livres. Near Trarbach, at the extremity of the western branch of the Vosges, there are mines of copper and lead, with some silver. (Ib. xi. 43, &c.) About six miles to the south of Trarbach, the mountain Eckelsberg displays singular picturesque walls of quartz, running from east to west, the intermediate schistus being decayed. Many parts of the Hunzruck, or region between the Mozelle and the Nahe, are covered with blocks of quartz.

† Journ. des Mines, Ann. vii. p. 171. ‡ Ibid. Ann. iii. No. 4. p. 41.

is found in considerable quantities at Aveyron. The Pyrenees in particular supply beautiful marbles; and the extensive and various territories of France afford several precious stones, as the aqua marina, the hyacinth, the chrysolite, and even the sapphire.

Mineral Waters. The chief mineral waters of France, are those of Barrège, Banière, Forges, Vichi, Bourbonne, Balaruc, Plombieres. The warm baths of Barrège, in particular, at the foot of the Pyrenees, have been long celebrated, and there the Queen of Navarre lays the scene of her tales. The baths of Bagneres are in the same neighbourhood.

Natural Curiosities. Among the natural curiosities of France, or those objects which, in an enlightened age, attract particular observation, may be named the singular mountains of Auvergne already mentioned, and which struck even Mr. Young as volcanic; but as he refers to the work of Faujas de St. Fond, it is probable that he was misled by that theoretic writer. The scenery here, is however, richly deserving of attention; and has escaped most travellers, who have pursued the dull route to Dijon, instead of this variegated road, which may conduct them by Nismes, and Aix, into Italy. The fountain of Vaucluse, celebrated by Petrarca, is a river springing suddenly from a cavern at the bottom of a perpendicular rock. Nor must the noted plain of La Crau be forgotten, which lies in Provence, not far from the mouth of the Rhone. This is the most singular stony desert that is to be found in France, or perhaps in Europe*. The diameter is about five leagues, and the contents from twenty to twenty-five leagues square, or about 150,000 English acres. It is entirely composed of shingle, or round gravel, some of the stones as large as the head of a man, and the shingle of the sea-shore is not more barren of soil. Beneath is a small mixture of loam with fragments of stone. In the winter there are scattered piles of grass, which, from the vast extent of the space, pasture a considerable multitude of sheep. Mont St. Michael in Normandy is another natural curiosity, being a solitary hill rising near the sea, like St. Michael's mount in Cornwal. In general, however, France being mostly a plain country, does not present much singularity of feature; and the scenes of the Cevennes and Pyrenees have been little explored by travellers, who passing to the chief cities, generally see only the most uninteresting parts of the country. Even Bretagne, it is probable, may present many singularities, which may have escaped the attention of the French themselves, who do not appear to be much impressed with such objects. They have however commemorated with some attention, various natural caves, which in France, as in other countries, present themselves in calcareous rocks. One near the village of Beaume, about six leagues from Besançon, is remarkable from its containing a glacier; and it was fabulously reported that the ice increased during the summer, and diminished in the winter, till recent observations evinced, as was to be expected, the contrary position.† This cave is at the bottom of a small valley in the midst of a thick forest. The mouth, which is level with the vale, is forty-five feet broad; and after a long and steep descent appears a hall of one

* Young, i. 379. † Journ. des Mines, xxi. 65.

hundred feet high, whence there is a passage to the chamber containing the glacier, the descent to which is by a ladder of forty feet. In this triangular cavern are vast stalactites of solid ice, which are sometimes nearly joined by pillars of the same material, rising from a magnificent pedestal on the floor. While the thermometer of Reamur, placed without, was at twenty degrees and a half, it here fell to one and three-quarters. This phenomenon may be partly owing to the direction of the aperture of the cave, which fronts the north.

The noted wonders of Dauphiné comprise many Alpine scenes. In the department of Ardéche, on the other side of the Rhone, are several natural curiosities, such as the bridge of rock, under which the river Ardéche passes, near the village of Chames, the grottos of Vallon, the gulf of Goule, with many singular basaltic columns, causies, &c. and what the French authors style craters of volcanos.*

* Journ. des Mines, Ann. vi. p. 626.

FRENCH ISLES.

FRENCH ISLES. THE isles around France are so small, and unimportant, that they would scarcely be deserving of notice, were it not for events that have taken place during this war.

CORSICA. The isle of Corsica must however be excepted, if it continue to be regarded as a part of the French territory. From the dominion of Carthage, this isle passed under that of Rome, and was for some time subject to the Saracens of Africa. In the time of the crusades it was assigned to the republic of Pisa, and was afterwards conquered by the Genoese. In 1736 the malecontents rejected the Genoese yoke, and chose a German adventurer for their king. After many ineffectual struggles, Corsica was ceded to the French, who continue to maintain a dubious authority. The Romans did not certainly highly esteem this island, when they selected it as a place of exile; and according to a modern French geographer "the air of Corsica is thick and unwholesome, the territory full of mountains, of little fertility, and ill cultivated: the vallies nevertheless produce corn, and the hills wine, fruits, and almonds"*. This plain account seems preferable to the exaggerations of party writers in England, who swell the advantages of this island; but it is probable that, as they assert, small veins of silver may be found, and that the mountains may afford granite, porphyry, jasper, &c., which however abound in the Highlands of Scotland.

HYERES. The isles called Hyeres, near Toulon, have been equally magnified by a female traveller. Mr. Young informs us that they have a barren and naked appearance, and only present some melancholy pines.† They however contain some botanic riches, and may claim the fame of being Homer's isle of Calypso.

OLERON. On the western coast, first occurs the isle of Oleron, about fourteen miles long, by two broad, celebrated for a code of maritime laws issued by Richard I, king of England, of whose French territory, this isle constituted a portion.

* La Croix, i. 528. † France, i. 195.

Re. To the north is the isle of Ré, opposite Rochelle, noted for an expedition of the English in the seventeenth century, described by Lord Herbert of Cherbury.

Yeu. Yeu is a small and insignificant isle, followed by Noirmoutier, which became remarkable in the war of La Vendeé, being about eight miles long, and two in breadth.

Bellisle. Bellisle has been repeatedly attacked by the English: it is about nine miles long, and three broad, surrounded by steep rocks.

Ushant. The isle of Ushant, or Ouessant, is remarkable as the furthest headland of France, towards the west, being about twelve miles from the continent, and about nine in circumference, with several hamlets, and about 600 inhabitants. Several other small isles may be passed in silence, but those of St. Marcou, about seven miles south-east of La Hogue, may be mentioned as in our possession: they received their name, it is believed, from a Norman saint, Marcoul, abbot of Nantouille, who died in 558.

NETHERLANDS.

HISTORICAL GEOGRAPHY.

NAMES.—EXTENT.—ORIGINAL POPULATION.—HISTORICAL EPOCHS.—ANTIQUITIES.—RELIGION.—GOVERNMENT.—LAWS.—POPULATION.—REVENUE.—POLITICAL IMPORTANCE AND RELATIONS.—MANNERS AND CUSTOMS.—LANGUAGE.—LITERATURE.—EDUCATION.—UNIVERSITIES.—CITIES AND TOWNS.—EDIFICES.—INLAND NAVIGATION.—MANUFACTURES AND COMMERCE.—CLIMATE AND SEASONS.—FACE OF THE COUNTRY.—SOIL AND AGRICULTURE.—RIVERS.—MOUNTAINS.—FORESTS.—BOTANY.—ZOOLOGY.—MINERALOGY.—MINERAL WATERS.—NATURAL CURIOSITIES.

THOSE provinces of the Netherlands which were formerly subject to the house of Austria, have been recently annexed to the French dominions. As this fertile territory may probably continue to be united to France, it became necessary to use as much brevity as possible in the description, that it might not, in that case, be disproportionate to the account of that country.

NAMES. The Netherlands in general, were anciently known by the name of Belgic Gaul, the chief inhabitants of this part being the Menapii, the Tungri, the Nervii, and the Morini. After the irruption of the Franks, this country formed part of Neustria, or the new kingdom, (the ancient kingdom of the Franks being on the east of the Rhine,) partly belonging to the province of Flandria, and partly to that of Lotharingia, or Lower Lorrain*. In the middle of the ninth century arose the powerful house of the earls of Flanders; and the counts of Hainaut commence about the same epoch. The dukes of Lower Lorrain and Brabant are little known till the end of the tenth century. These and other great inheritances gradually fell under the power of

* D'Anville, Etats formés en Europe, 70. &c.

the dukes of Burgundy, who in the fifteenth century enjoyed dominions worthy of the regal title. With the heiress of Burgundy the Netherlands passed by marriage to the house of Austria.

EXTENT. The length of the Austrian Netherlands, computed from the eastern limit of Luxembourg, to Ostend on the ocean, may be about 180 British miles; and about 120 in breadth, from the northern boundary of Austrian Brabant to the most southern limit of Hainaut. The extent is computed at 7520 square miles, with a population of 1,900,000. But if the French territory be extended to the Rhine, and thus include large portions of the German circles of Lower Rhine, and Westphalia, the territory and population may be increased by at least one third.

ORIGINAL POPULATION. The original population was Celtic, but was supplanted by the Belgæ, a German colony, afterwards vanquished by the Franks, a kindred nation. The progressive geography may be traced with great certainty from the time of Julius Cæsar through the late Roman writers, and the Francic historians of the middle ages. The chief historical epochs are

HISTORICAL EPOCHS. 1. The events while the Romans held Gaul.

2. Under the Merovingian race of French kings.

3. The ancient earls of Flanders, and Hainaut, and other potentates who shared these territories.

4. The dukes of Burgundy. During these two epochs the Netherlands became the great mart of commerce in the west of Europe, and were distinguished by opulence, and the arts.

5. The Austrian domination, accompanied with repeated unsuccessful struggles for freedom. The seven United Provinces having, however, established their liberty, the commerce, and prosperity of the southern regions quickly passed to their northern neighbours.

ANTIQUITIES. The remains of Roman art are little memorable, and the chief antiquities consist in grand ecclesiastical, and civil monuments of the middle ages, when these regions concentrated a great part of the wealth of Europe, and abounded in excellent artists of all descriptions.

RELIGION. The religion of the Netherlands is the Roman Catholic; and till the French revolution, the inhabitants were noted for bigotry, a great part of the wealth being in the hands of ecclesiastics. The ancient cultivation of the arts had also a share in this attachment, and the catholic system being naturally endeared by this connexion, while the Reformation has chiefly succeeded in those northern regions where the progress of the arts had not yet captivated the affections of the people. The metropolitan see was the archbishoprick of Mechlin, or Malines. The bishopricks were those of Bruges, Antwerp, Ghent, &c., in number nine or ten.

GOVERNMENT AND LAWS. The government and laws had some features of what was formerly deemed freedom; but the decline of commerce having lessened the consequence of the cities and burgesses, this liberty became the monopoly of the nobles, and clergy, who often opposed the will of the sovereign, when exerted in the most beneficial manner for the good of the community. The *Joyeuse entrée*

was the magna charta of the Netherlands, a constitutional bond of national privileges. Yet the aristocracy was mild, and the people in general more happy and contented, than they are likely to prove under the tyranny of freedom.

POPULATION. The population being computed at 1,900,000, and the square extent at 7520 miles, there will be 252 inhabitants to the square mile, while France yields only 174.

REVENUE. Under the Austrian power, the revenue of the Netherlands scarcely defrayed the expenses of government, and the various extortions of the French rulers cannot afford sufficient data to compute an equitable and lasting revenue.

POLITICAL IMPORTANCE AND RELATIONS. The political importance and relations of these provinces have been long immerged in those of the house of Austria. Their truest interest would have been to have entered into the Dutch confederacy, and thus have established on a broader basis a commercial power, which in strict alliance with England might have defied the encroachments of French ambition: nor must the difference of religion be considered as the chief obstacle to so desirable an event, but rather the narrow policy of the Dutch, who by blocking up the Scheld, and other acts of outrage, excited indelible enmity, where they ought to have secured lasting friendship. But commercial monopoly, which solely considers present gain, is of all others the most unfit spring of government, which ought to regard the advantage of distant posterity. In the present instance it led the Dutch to the annihilation of their own power and prosperity; while, if the commerce of the southern states had continued uninterrupted, mutual interests might have formed a broad basis of lasting security.

MANNERS AND CUSTOMS. The manners and customs of the Netherlands partake of those of their neighbours the Dutch and French, the phlegm of the one being tempered by the vivacity of the other. The lower classes were fond of religious pageantry, and much addicted to the superstitious observances of the Catholic system.

LANGUAGE. The Flemish language partakes of the German, and of the Dutch.

LITERATURE. These provinces boast of early literature, after their conversion to christianity in the seventh century, in various chronicles, and lives of saints; but in modern times they have rarely produced writers of great talents. The native language remains uncultivated, and the chief authors have used the Latin or the French. Froissart was born at Valenciennes, in French Flanders; Philip de Comines at the town so called, about eight miles to the north of Lisle, and situated in the same division. Lipsius, a man of considerable erudition, was born near Brussels. But in general the Southern Netherlands are more eminent in artists; and the United provinces in literary characters.

EDUCATION. The education was neglected as in most catholic countries, where the Jesuits in vain attempted to bring it to a level with that of the protestant states.

UNIVERSITIES. The universities, which in no country are of equal importance with the schools, were, however, numerous, considering the extent of the country. Exclusive of Tournay (Dornick)

which has been long subject to the French, there were others at Douay, and St. Omer, much frequented by the English catholics; and one of still greater celebrity at Louvain, founded in 1425. The illustrious professors, commemorated with such applause by Guicciardini, nephew of the great historian, who published an ample description of the Netherlands in the sixteenth century, have been long since forgotten, as to posterity their studies have appeared neither amusing nor useful.

CITIES AND TOWNS. One of the chief offices of geography, in ancient and modern times, being to give a short descriptive catalogue of the chief cities and towns in the regions described, these must not be wholly omitted even in this short abstract. The three chief cities in what were called the Austrian Netherlands, are Brussels, Ghent, and Antwerp.

BRUSSELS. The capital city of Brussels still contains about 80,000 inhabitants, and is beautified by a noble square, one side of which is occupied with a vast guildhall; by numerous churches and fountains. It is situated on the small river Sen, or Senne, which runs into the Dyle and the Scheld. It is known as early as the tenth century, and in the fourteenth was surrounded with walls. The imperial palace, the wonted residence of the governor of the Netherlands, displays considerable taste and magnificence.

GHENT. Ghent contains about 60,000 souls, and the circumference of the walls is computed at fifteen miles, as it is built on a number of little islands formed by four rivers and many canals, and includes gardens, and even fields*. Some of the streets are large and well paved, but only a few churches now deserve attention.

ANTWERP. The inhabitants of Antwerp are computed at 50,000, the sad remains of great population and prosperity. This city being placed upon the estuary of the Scheld, and formerly the chief mart of Flemish commerce, there is a strong citadel, erected by the sanguinary duke of Alva. The harbour was excellent, but besides the artificial impediments at the mouth of the Scheld, the Dutch fort of Lillo commands the approach. The streets, houses, and churches are worthy of the ancient fame of the city. The exchange is said to have afforded a pattern for that of London. The churches are decorated with many paintings by Rubens, Vandyke, and other Flemish masters. In 1568 the trade is supposed to have been at its greatest height; and the number of inhabitants was computed at 200,000. It still contains a number of the rich descendants of the ancient merchants: with some commerce, and a few flourishing manufactures, particularly of lace and linen. Of the other principal towns, Mons is computed at 25,000 inhabitants; Bruges and Namur, each at 20,000; Luxembourg at 12,000; Roermond at 10,000; Limbourg at 8,000.

SEA-PORTS. The sea-coast of Flanders, the maritime province, consists chiefly of sandy hills, and downs, and has few inlets, as most of the rivers flow into the Scheld. There are however two ports which deserve particular notice. The Sluys†, called by the French

* Marshal ii. 22.

† Sluys belonged to the United Provinces, but is here mentioned, considering the Netherlands to the Rhine as an appendage of France. Nieuport, a little fishing town, scarcely deserves notice.

L'Eclues, derives its name from the sluices, by which the circumjacent country may be laid under water. And a similar circumstance gives name to Helvoet Sluys, a sea-port of Holland, situated in the island of Vorn, about forty miles more to the north. Guicciardini says that the haven of Sluys was capable of containing 500 ships. The port and population now yield greatly to those of Ostend. This only other haven on the Flemish shore has been considerably frequented since the Scheld was abandoned. The town is still computed to contain 14,000 souls, though it suffered greatly by the famous siege which terminated in 1604, when it was gallantly defended by Sir Francis Vere, at the head of a few English troops. Many English families were settled here before Ostend fell a prey to the French.

In general it may be observed that, even at the present day, every traveller is impressed with surprize, not only at the number, but the great extent of the Flemish cities, towns, and even villages; in which respect the Netherlands exceed every country in Europe, only excepting the United Provinces.

EDIFICES. The chief edifices are the cathedrals, churches, and monasteries; though a few castles belonging to ancient families, or rich merchants, used to attract some notice: the taste of the latter buildings being faithfully copied in the Flemish landscapes, and more remarkable for little prettiness, peaked roofs, fantastic ornaments, the muddy moat, and drawbridge, than for grandeur of design, or amenity of situation.

INLAND NAVIGATION. Idle would be the attempt even to enumerate the canals which intersect these provinces in all directions. Some of them date even from the tenth century, and the canal from Brussels to the Scheld is of the sixteenth. Other important canals extend from Ghent, Antwerp, Ostend, and other cities, and towns, especially in the western districts; but, under the Austrian domination, these important means of intercourse were shamefully neglected, and it will require much time and labour to restore them to their ancient utility*.

MANUFACTURES AND COMMERCE. The manufactures and commerce of the Netherlands, for a long period superior to any in the west of Europe, have suffered a radical and total decline, owing partly to the other powers entering into competition, and partly to the establishment of freedom in the United Provinces, whence Amsterdam arose upon the ruins of Antwerp. What little commerce remains is chiefly inland to Germany, the external employing very few native vessels. The East India company established at Ostend was suppressed by the jealousy of England, and other powers; and the chief commerce was afterwards carried on by the English established in that city. Yet of the manufactures a few fragments remain: Cambray, long subject to the French, is still renowned for the cambrics which thence derived their name; as Tournay, or Dornick was anciently famous for the finest linens. At Bruges there are still some manufactures of broad says, baize, and other woolens; considerable fabrics of broad-cloth, druggets, shalloons, and stockings, were conducted at St. Omers, chiefly with wool smuggled from England†. But

* Philips, 48. † Marshall, ii. 11.

the chief manufactures are of tapestry, fine linen, and laces, at Mechlin, Brussels, Ghent, Antwerp, Louvain, which still enrich the country around, and induce the farmers to cultivate flax, even on the poorest soils*. The Netherlands produce, for home consumption, abundance of corn, and vegetables; and the coal mines would become important, if the operations were skilfully conducted. There is besides abundance of turf for fuel; with iron, porcelain clay, and other commodities.

Climate and Seasons. The climate of the Netherlands considerably resembles that of the south of England, and is more remarkable for moisture than for warmth: yet the duchy of Luxembourg produces some wine, which probably has the austerity of the Rhenish, without its spirit.

Face of the Country. The face of the country is in general level, and the semblance of hills can scarcely be discovered, except towards the east, where a few elevations relieve the eye from the general flatness of the other regions.

Soil and Agriculture. The soil is in general rich sandy loam, sometimes interspersed with fields of clay, but more often with large spaces of sand. Such has been, even in distant ages, the state of agriculture that the Netherlands were long esteemed the very garden of Europe, a praise which they still share with Lombardy and England. No stronger proof can be adduced of the advantages, which commerce confers on agriculture, than this country, which evinces that the latter advantage chiefly arises from commercial opulence employed in its most useful direction. The mere farmer can never become opulent, except from the pre-existent benefits of trade; but while he is sharing the national wealth thus acquired, it is natural that he should impute his success solely to his own labours. It must readily occur that Lombardy, also celebrated for its agriculture, was the country of the ancient bankers of Europe, who returned there to enjoy the fortunes which they had acquired; and that England is pre-eminent in mercantile wealth: so that the plain facts are worth a thousand theories. An accurate observer† repeatedly praises the state of agriculture in the Netherlands, and points out many advantages which it maintained over that of England. The repeated crops of excellent clover, the cole, the turnips, the clean crops of flax, barley, and oats, deservedly attracted his attention. He remarks that the agriculture has been celebrated for these 600 years, ever since their commerce and manufactures became eminent; and that they still possessed the essentials of good husbandry in the destruction of weeds and perpetual crops‡. They commonly used four horses without a driver, the ploughman holding the reins, and being equipped with a long whip stuck into a socket. The plough had wheels, and the furrows were shallow, as they did not wish to turn up the sharp and unmanured sand: on some low spots, between little eminences were seen abundance of hops, a native and peculiar product adopted in England in the reign of Henry VIII. They never allow the land to lie fallow, regarding the destruction of weeds as the sole advantage of such a practice, which may be

* Marshall, ii. 63. † Ibid ii. ‡ p. 65.

equally accomplished by crops of turnips, rape, beans, and clover, which not only destroy the weeds but enrich the soil.

Rivers. The Netherlands are watered by so many rivers and canals, that it will be sufficient to mention only a few of the chief streams. The Rhine belongs to Germany, passing at a considerable distance to the east of the frontier; and but a small extent of the Meuse, or Maas, pervades the county of Namur, in these Netherlands. The chief river is the Scheld, which receives two other streams, the Lys, and the Scalpe, the latter near Mortagne, the former near Ghent. All these rivers arise in the county of Artois, from no considerable elevation; and the whole course of the Scheld, or French Escaut, cannot be comparatively estimated at above 120 miles*. The Dyle rises not far to the north-west of Namur, and joins the Scheld above Niel, after receiving from the east the Dermer, the Nette, or Nethe from the north, and the Senne from the south. Most of the other rivers yield in importance to the canals, and it would indeed be difficult in many instances to determine whether their course be the work of nature or art. There is no lake worthy of commemoration.

Mountains. Though there be little ridges of hills in the counties of Namur, and Luxembourg, the traveller must proceed to the distant banks of the Rhine before he meets with any elevation that can deserve the name, even of a small mountain. There are, however, several woods even in the centre of Flanders; and in Brabant is the forest of Soigne. Further to the east and south are immense forests, which almost pervade Hainaut and Luxembourg, from Valenciennes to Treves, forming striking remains of the ancient forest of Ardennes.

Botany. The vegetable productions of the catholic Netherlands differ in no respect from those of Holland, and all the plants that are natives of this country may be met with in the sandy and marshy districts of the south-east coast of England, except the Gentiana cruciata. A few species indeed, which are rare with us, are of frequent occurrence in the Netherlands, particularly the Senecio paludosus, *marsh ragwort*, in shallow ditches; Eryngium campestre, *field erymgo*, in great plenty by the side of the roads; and the elegant Menyanthes nymphoides, *fringed water-lily*, adorning the canals, and other deep low streams.

Zoology. The zoology of the Netherlands affords no remarkable materials. The breed of horses and cattle is esteemed for size.

Mineralogy. So plain a country cannot be supposed to supply many minerals: yet coal, perhaps the most precious of them all, is found in several districts, and the ingenuity of the French has been exerted in an improvement of the operations. In the county of Namur are also found lead, and copper; and Hainaut affords iron, and slate. From its iron works Luxembourg derives its chief wealth; and the forest of Ardennes is still renowned for the metal of war. Marble, and alabaster are also found in the eastern districts.

* The Scheld properly rises about eight miles north of St. Quintin, in the modern department of the Aisne.

MINERAL WATERS. There are no mineral waters of much reputation in the Netherlands; but in the neighbouring circle of Westphalia are those of Aix-la-Chapelle, and still nearer those of the Spa, about twenty-six British miles south-east of the former, and discovered towards the beginning of the fourteenth century.

NATURAL CURIOSITIES. The natural curiosities of so flat a country cannot be supposed to be numerous, nor have travellers indeed indicated any one object of this kind.

RUSSIA IN EUROPE.

CHAPTER I.

HISTORICAL GEOGRAPHY.

NAMES.—EXTENT.—BOUNDARIES.—ORIGINAL POPULATION.—PROGRESSIVE GEOGRAPHY AND PRESENT BOUNDARIES.—HISTORICAL EPOCHS AND ANTIQUITIES.

THE Russian empire is, perhaps, the most extensive that ever existed; the length being about 9200 English miles, and the breadth 2400*. But the oriental part presents vast deserts, and a slender population, as will appear in the division of this work appropriated to Asia. The present article must be restricted to an account of Russia in Europe.

By the final partition of Poland, this division now extends from the river Dniester to the Uralian mountains, that grand chain which naturally divides Europe from Asia, a length of about 1600 miles; and in breadth above 1000 English miles. The extent is computed at about 1,200,000 square miles.

NAMES. Even the European part of the Russian empire embraces many ancient kingdoms and states; but the chief name, that of Russia, shall only be here considered. Amidst the grand conflux of nations towards the west, which attended the decline and fall of the Roman empire, the Slavonic tribe of Rossi escaped the observation of history till the ninth century; and it is uncertain whether the term

* Tooke's View of the Russ. Emp. 3 vols. 8vo. i. p. 6.

were native, or imported by the Scandinavian chiefs who founded the Russian monarchy*. In the sixteenth century, when Russia first attracted the observation of enlightened Europe, we find that the new appellation of *Muscovia* had unaccountably passed among foreigners from the capital to the kingdom, an impropriety which long maintained its ground, and has not even yet finally expired. It probably arose from the name of Russia having been imparted, with the epithets white, red, &c. to distant provinces, one or two of which, were subject to Poland; whence the vagueness of the appellation induced strangers to indicate the kingdom by the metropolis, a practice not unusual in the obscurity of the middle ages.

ORIGINAL POPULATION. The grand population of the European part of the Russian empire is well known to be Slavonic. The Slavons form an extensive original race of mankind, radically distinct from the Goths on the one hand, who, as possessing the countries more to the west, must have preceded the Slavons in their passage from Asia into Europe; and equally distinguishable, in language, person, and manners, from the Tartars and other nations on the east. They are the Sarmatæ of the ancients; and were ever remarkable for personal elegance and strength.

PROGRESSIVE GEOGRAPHY. To enter much into the progressive geography of the Russian empire, would be to write a history of its revolutions. Till the sixteenth century, this empire continued almost unknown to the rest of Europe, and its geography must be faintly traced in the Byzantine annals, particularly in the work of Constantine Porphyrogenitus on the administration of the Empire. Even at that period the Russians held the spacious province around Moscow; and though confined on the east, extended their power to the Baltic, and the vicinity of Prussia. Towards the south the river Borysthenes conducted them to the Euxine sea. The capitals were Novagorod and Kiow; the former afterwards famous for its alliance with the Hanseatic league; the latter still memorable for its catacombs. The city of Julin, at the mouth of the Oder, was also remarkable for its trade and opulence in the eleventh century, being the mart of commerce between the Slavonic nations and the western regions of Europe; but that capital belonged to the western Slavons and was distant from the frontiers of Russia. The victories of the Tartars constrained the Russian princes to abandon Kiow about the middle of the twelfth century, and that city having been ruined by the Tartars in the thirteenth, Moscow became the seat of empire. The geography of Russia, in the middle ages, becomes not a little embarrassed from its repeated subdivision into small monarchies, which remained in a state of vassalage to the Tartars till the year 1462, when Russia emerged from this eclipse, and gradually acquired its present extent and power. Not to detail the successive addition of province to province, and kingdom to kingdom, it must, however, be remembered, that a great founder of the Russian power was Ivan IV, who reigned from the year 1534 to 1584, and subdued the Tartar kingdom of Astracan, and some provinces on the north-west. His successor Feodor I, turned his arms

* Gibbon x. 219.

towards Siberia, a country which has been however most slowly investigated, and indeed scarcely known till the year 1730. In modern times, Russia has gradually extended her limits at the expense of the Turks; and the addition of an ample third of Poland, has afforded her a source still more stable and fertile of men and power.

HISTORICAL EPOCHS. The following appear to be the chief historical epochs of this mighty empire.

1. The foundation of the kingdom by Ruric, a Scandinavian chief, A. D. 862. His descendants held the sceptre above seven hundred years.

2. The naval expeditions of the Russians against Constantinople, in the tenth century.

3. In the same century the baptism of Olga the queen, and the subsequent conversion of the Russians to christianity.

4. The invasion of the Tartars under Batu Khan in 1236, and the subsequent vassalage of Russia.

5. The abolition of the power of the Tartars by Ivan III, who died in 1505.

6. The reign of Ivan IV, surnamed Basilowitz, known to western historians by the style of the tyrant John Basilides.

7. The death of the Czar Feodor in 1598, with whom expired the long progeny of Ruric. Several impostors afterwards appeared, under the name of Demetrius, the murdered brother of this sovereign.

8. The accession of the dynasty of Romanow 1613, in the person of Michael Feodorowitz, sprung in the female line from Ivan IV. He was followed by his son Alexis, father of Peter the Great.

9. The reign of Peter I has been justly considered as a most important epoch in the Russian history; but on reading the annals of the preceding reigns from that of Ivan IV, it will be perceived that a part of our admiration for Peter arises from our inattention to his predecessors; and that the light which he diffused was far from being so sudden and grand as is commonly imagined.

10. The late reign of Catharine II deserves to be commemorated among the most brilliant epochs in the Russian annals; nor must her personal crimes exclude her from the list of great and able sovereigns.

ANTIQUITIES. Of ancient monuments Russia cannot be supposed to afford great variety. Sometimes the tombs of their pagan ancestors are discovered containing weapons and ornaments. We learn from Herodotus that the Scythians regarded the tombs of their princes with singular veneration; and the Sarmatians or Slavons seem to have imbibed the same ideas. The catacombs at Kiow were perhaps formed in the pagan period, though they be now replete with marks of christianity. They are labyrinths of considerable extent, dug as would appear, through a mass of hardened clay, but they do not seem to contain the bodies of the monarchs*.

The idols of Pagan Russia are sometimes found cast in bronze; and Dr. Guthrie of Petersburg has given an ingenious account of the Sla-

* Herbin. Cryptæ Kijovienses.

vonic mythology*. The chief god, Peroun, was supposed the author of thunder; Voloss resembled Pan; Swetovid was the Sun or Apollo; Silnoy Bog, or the strong god, was Hercules; Leda resembles Mars, &c. Many divinities presided over love, such as Lada or Venus; Lelio or Cupid, and his brother Dido, who, like the Anteros of the Greeks, counteracted the power of Cupid. Radagast was the god who protected towns. The Russians had also goddesses corresponding with Ceres, Diana, and Pomona; and their Roussalki were nymphs of the woods and waters. The Pagan Russians also worshipped Znitch or Vesta, in the form of fire; and venerated waters, the Bog or Hypanis being as highly regarded as the Ganges among the Indians: the Don and the Danube were also holy streams; and there was a sacred lake, environed with a thick forest, in the isle of Rugen, which was adored by the Slavonic tribes.

The conversion of the Russians must of course have been followed by the erection of many churches; but as Byzantine or Italian architects were employed, those edifices have but few peculiarities. Perhaps no country of considerable extent can afford fewer monuments of ancient art than Russia.

* Dissertations sur les antiquités de Russie, 1795. 8vo.

CHAPTER II.

POLITICAL GEOGRAPHY.

RELIGION.—ECCLESIASTIC GEOGRAPHY.—GOVERNMENT.—LAWS.—POPULATION.—COLONIES.—ARMY.—NAVY.—REVENUES.—POLITICAL IMPORTANCE AND RELATIONS.

RELIGION. THE religion of Russia is that of the Greek church, of which, since the fall of the Byzantine empire, this state may be considered as the chief source and power. The creed and ceremonies of the Greek church vary considerably from the Roman, and often in such minute circumstances that a detail would become tedious: the Greeks believe in the procession of the Holy Ghost from the Father alone, while the Roman orthodoxy includes the Son in the mystery. In pomp the Grecian ceremonies do not yield to the Roman catholic; but while the Greeks admit pictures into their churches, they reject images with abhorrence.

ECCLESIASTIC GEOGRAPHY. The chief patriarch of the Russian church had usurped extraordinary powers, to the great injury of the imperial prerogative; but the spirit of Peter I. broke these ignominious bonds, and the patriarchs have since become complaisant instruments of the court. The clergy are very numerous, and have several privileges, particularly exemption from taxes. They have been computed at 67,000, secular and regular. The Greek religion permits the marriage of the secular clergy. The cathedrals and parish churches in the empire are computed at 18,350; the monasteries at 480; nunneries 74; monks supposed to be 7300, nuns 3000. The monasteries have not been such favourite resorts since Peter I. and Catharine II. opened the sources of industry. The bishoprics amount to about thirty.

GOVERNMENT. The government of Russia appears to have been always despotic, there being no legislative power distinct from that of the sovereign. What is called the senate is only the supreme court of judicature. In 1606 the Czar Basil pretended to a free election by the senate or people; but his coronation was produced by intrigues among the chiefs; and there appears no vestige in Russian history of any national council or parliament, or estates of the empire, far less of a free elective diet, like that of Poland, another Slavonic nation, which a false semblance of liberty led to destruction, while the slavery of Russia produced gradual aggrandizement. Nothing indeed can be more opposite to any theories of government, influence of climate, national character, &c. than the contrast between Russia and

Poland. In Russia there is an uniformity of subjection, which at least blends the nation in one united mass, while in Poland the nobles alone were free, and the king and the people alike slaves; but the Polish nobles were strangers to the grand maxim, that the slavery or destruction of the nobility must soon follow that of the people. This vast empire is divided into about forty governments, or vice-royalties, of which thirty-four may be assigned to the European part. The whole frame of the government may be pronounced to be military; and nobility itself is only virtually estimated by rank in the army.

Laws. Immediately on the fall of the Roman Empire, we find the Gothic tribes sedulously collecting and publishing their peculiar codes of laws; but it would be difficult to discover any Slavonic code till the sixteenth century; when they emanated, not from the national council, but from the arbitrary will of the monarch. Even in Poland, a country more early civilized than Russia, the first appearance of laws is in a few edicts of Casimir the Great, in the fifteenth century; nor is there any semblance of a code more ancient than the middle of the sixteenth. This singular defect may perhaps contribute to account for the fates of the Slavonic nations; and even the pretended Polish liberty of electing the monarch had not existed above three hundred years. The first Russian code dates from the reign of Ivan IV; and the late Empress had the merit of drawing up a new code with her own hands.

Population. The population of Russia is so diffuse, and spread over so wide an extent of territory, that very opposite opinions have been entertained concerning it. By most writers it was only estimated as equal to that of France, or about 25,000,000: and it was at the same time supposed that the recent acquisitions in Poland might add 5,000,000 to the amount. But in a late publication*, Mr. William Tooke, who has long resided in Russia, and appears to be intimately acquainted with the original documents concerning that empire, has given new elucidations of this important subject, which considerably swell the sum of the inhabitants. He observes that, in order to collect the capitation tax, enumerations of the people have been made at intervals of twenty years, since 1723. On the first enumeration, the persons subject to the tax were stated at 5,794,928: this number was always upon the increase; and in 1763 was supposed to yield data for the computation of 20,000,000, as the total population of the empire. But in 1783, more exact estimates were prepared; and in the forty-one vice-royalties, then composing the empire, the state of male inhabitants† was as follows:

Merchants	107,408
Burghers	293,793
Odnodvortzi, and free countrymen	773,656
Exempt from taxes	310,830
Crown boors	4,674,603
Private boors	6,678,239
	12,833,529

* View of the Russ. Emp. ii. 124.

† Even male babes are included in the capitation tax, under the denomination of their parents.

The number of females being supposed to equal that of the males, a population would arise of 25,677,000. The most important accession to the Russian population arises from the partitions of Poland, which with small acquisitions from the Porte have been thus stated*:

At the first partition of Poland in 1773	1,226,966
From the Porte in the years 1774 and 1783	171,610
From the Porte in the year 1791	42,708
At the second partition of Poland 1793	3,745,663
By the subjection of Courland	387,922
At the third partition of Poland 1795	1,407,402
	6,982,271

Mr. Tooke afterwards proceeds to give the following account, drawn up as he assures us, with the greatest nicety of examination, and presenting the whole population of the empire in 1799:

"By the revision of 1783 there were in the said forty-one governments, computing the female sex as equal to the male, of registered persons	25,677,000
"The amount of the Kozaks of the Don and the Euxine, according to the most authentic private accounts at least	220,000
"For the unnumbered tribes and classes, at the time of the fourth revision, we cannot without the highest improbability allow less than	1,500,000
"Consequently the Russian empire in the year 1783, might have inhabitants amounting altogether to	27,397,000
"According to the results deduced from experiments and observations on the fruitfulness and mortality in Russia, this mass must of itself have increased annually more than half a million. If, in order to keep as far as possible from all exaggeration, we deduct the half of this surplus of births, to allow for the diminution it may have suffered by an extraordinary mortality, as by war; there remains by every year an increase of 25,000 new citizens, which, exclusively of all ascending proportion, in twelve years makes a sum total of	3,000,000
"The new acquisitions since the year 1783, or the present nine vice-royalties of Taurida, Minsk, Bratzlau, Vosnesensk, Podolia, Volhynia, Courland, Vilna, and Slonim, contain according to a legitimated statement already mentioned	5,755,000
"Consequently we may admit, by the most moderate estimate, the population of the Russian empire at present to be	36,152,000
"Or in a round sum, thirty-six millions of persons."	

Of this population, Mr. Tooke assigns only about three millions and a half to Siberia, or Asiatic Russia, which contains the five governments of Perm, Ufa, Kolhyvan, Tobolsk, and Irkutsk; but Perm is itself situated on the European side of the Uralian mountains, so that we might perhaps allow even 33,000,000 for the population of European Russia.

COLONIES. Russia being a state new in maritime affairs, cannot boast of any colonies, nor can this name be applied to a small establishment or two in the eastern parts of Siberia.

* Tooke i 327.

Army. But on the Russian armies a great part of the fate of Europe and Asia must depend, and the subject of course deserves particular attention. Mr. Tooke estimates the whole amount of the Russian troops at 600,000, of which 500,000 may be esteemed effective. But it is supposed that not less than 150,000 are necessary in the garrisons, scattered over this vast and heterogeneous empire, so that if Russia sent forth her whole military force, it would hardly exceed 350,000, of which about 30,000 might be Cozaks. The Russian troops are remarkable for a kind of steady fanaticism, which renders their retreat almost impossible; but they are more accustomed to open and direct combat, than to the grand manœuvres of war. In weight and consistence they somewhat resemble the Spartan phalanx, which was forced to yield to the superior agility and rapidity of the Roman legion.

Navy. The Russian navy consists of several detached fleets, employed in the remote seas on which the empire borders at different extremities. The chief fleet is of course that of the Baltic, which consists of about thirty-six ships of the line. That in the Euxine, or Black sea, at the harbours of Sevastopol, and Kherson, was computed at twelve ships of the line, but not of a high rate, as the Euxine affords no great depth of water; but there are many frigates, gallies, xebecs, and gun-boats. The fleet of gallies in the Baltic, in 1789, was estimated at 110. The Russians are rather averse to a sea-faring life; and there is scarcely any prospect of this empire ever becoming a great maritime power.

Revenues. The revenues of Russia are supposed to amount to about 50,000,000 of rubles; which, valuing the ruble at four shillings, will be equal to 10,000,000*l.* sterling. The national debt is supposed to amount to little or nothing.

Political Importance and Relations. With all these advantages it is no wonder that the political importance, and relations of Russia are so preponderant in Europe, and Asia. In Europe, her recent acquisitions have contributed to render her more and more formidable. It is fortunate that the powerful dominions of Prussia, and Austria, are interposed between Russia and the German Empire, else the liberties of Europe would be endangered, and perhaps totally crushed, by a new flood of barbarians issuing from the same sources with those which formerly deluged the civilized world. If the Russian empire be not divided, there is room to predict that another Macedon will subdue another Greece. Poland has been devoured; Denmark and Sweden may be considered as subject-allies; and if the whole force of Russia were bent against either Austria or Prussia, it is hardly to be conceived that the shock could be withstood. It would certainly be for the interest of Europe that the Russian force should be diverted towards Asia, that by extending her dominions in that quarter, her strength may be still more dispersed, when probably a division of the empire would commence, to the lasting advantage of the other continental powers. As the Greek religion prevails among the Christians of Greece, and Asia, Russia would in them find more faithful subjects, than among the catholics and protestants of Europe.

CHAPTER III.

CIVIL GEOGRAPHY.

MANNERS AND CUSTOMS.—LANGUAGE.—LITERATURE.—EDUCATION.—UNIVERSITIES.—CITIES AND TOWNS.—EDIFICES.—ROADS.—INLAND NAVIGATION.—MANUFACTURES AND COMMERCE.

MANNERS AND CUSTOMS. AS the Russian empire comprizes so many distinct races of men, the manners of course must be very various. But in the European division, to which this brief account is restricted, the grand distinctions are, a few Laplanders on the east of the mountains of Olonetz, which divide Russia from Sweden; the Fins of the White sea, and the Baltic; the grand Slavonic mass in the centre, including the Cozaks of the south, who are also Slavons; and a few Tartars in Taurida, a beautiful region, which forms the south-east extremity of Europe. The Laplanders are well known to be a diminutive race, who would be amiable from the pastoral simplicity of their manners, were not their persons ugly, and disfigured with physical impurity. The Fins are also rather short in stature, with flat faces, deep cheeks, dark grey eyes, a thin beard, tawny hair, and a sallow complexion; but the southern Fins, though they retain the national features, are of superior appearance. There is a small district in the northern extremity of Scandinavia, idly called Finmark: but the chief region of the Fins is around the gulf of Finland, and thence on the south of the White sea, where was in ancient times the celebrated region of Permia, by the Scandinavian writers called Biarmia, which some suppose extended from the White sea, to the mountains of Ural. Permia is mentioned in the account drawn up by Ohter for the use of Alfred the Great: and a fabulous detail is given of its wealth, particularly the rich temple of Yummala, the chief god of the Fins, decorated with a profusion of gold, and jewels. Mr. Tooke* assures us that the ruins of ancient towns remain to evidence the civilization and prosperity of this people; and he supposes that the Permians traded with Persia, and India, by the Caspian sea, the rivers Volga and Kama, and that the mart was Tscherdyn, an old commercial town on the river Kolva. The repeated incursions of the Scandinavian pirates drove the Fins further to the south; and modern Perm is about seven hundred miles from the sea. The Fins used to excel in fishing and the chace; but they are now much blended with the Slavons, and have generally adopted their manners and customs.

* Tooke, i. 528.

The manners of the Slavonic Russians, who constitute the chief mass and soul of this empire, have been well described by Dr. Guthrie, and Mr. Tooke. They are generally middle-sized and vigorous: the tallness, and grace of the Polish Slavons seem to arise from superior climate, and soil. The general physiognomy consists of a small mouth, thin lips, white teeth, small eyes, a low forehead, the nose commonly small, and turned upwards, beard very bushy, hair generally reddish.* The expression of the countenance is gravity, with good nature, or sagacity; the gait and gestures lively and impassioned. The women destroy their naturally fine complexion with paint, and their personal charms expire at an early age. The Russian is extremely patient of hunger and thirst; and his cure for all diseases is the warm bath, or rather vapour bath, in which the heat is above 32° of Reaumur, which contributes greatly to health, and is supposed to be the only cause why that shocking disease, the Plica Polonica, has never appeared in Russia. Dr. Guthrie has shewn that the Russians retain many manners and customs derived from their Pagan ancestors, and has given some curious specimens of their songs and music, which seem to be very pleasing. He has also compared their dances with those of the Greeks; and finds in one of them a considerable resemblance of the wanton Ionic, while another resembles the Pyrrhic. He observes that the country girls dress in the *sarafhan*, resembling the ancient *stola*, and bind up their hair with the *lenta*, a ribbon like the ancient *vitta*. They tinge their cheeks with the juice of the *echium Italicum*. When a marriage is proposed, the lover, accompanied by a friend, goes to the house of the bride, and says to her mother, "shew us your merchandize; we have got money;" an expression which is thought to refer to the ancient custom of buying a wife. The other ceremonies are equally curious, but cannot be detailed in this abstract. The Russians shew great attention to their nurses, and are so hospitable, that they offer to every stranger the *Khleb da sol*, or bread and salt, the symbol of food, lodging, and protection. At a repast, some salt fish, or ham, and a glass of brandy, are presented in the first place; and after dinner, cakes made with honey are usually served; the common drink is kvass, an acid, thin, malt liquor: the houses are ornamented with stoves, and, among the rich, by flues conducted into every room, which is at the same time guarded with double windows. Fires are also employed with profusion to obviate the severity of winter in the northern provinces; but at Petersburg the air is so pure that there is no occasion to paint the iron chains in the streets, as they are not attacked by rust. In several instances the Russians form a curious junction of European, and Asiatic manners; many of their ceremonies partake of Asiatic splendor: the great are fond of dwarfs; and some opulent ladies maintain female tellers of tales, whose occupation is to lull their mistresses asleep, by stories resembling those of the Arabian nights.

Language. The Russian language is extremely difficult to pronounce, and not less difficult to acquire, as it abounds with extraordinary sounds, and anomalies of every kind. The characters amount to no less than thirty-six; and the common sounds are sometimes ex-

* Tooke, ii. 253.

pressed in the Greek character, sometimes in characters quite unlike those of any other language. The tones peculiar to the Russian are often expressed by letters, which wear a very ill chosen semblance to the Greek or Roman. In some respects the sounds seem to approach the Persian and Arabic; a circumstance which can hardly arise from the Mahometan domination of the Tartars, as after Nestor, who wrote his annals about the year 1000, there is a succession of Russian authors. Among other singularities there is one letter to express the *sch*, and another the *ssch*, the latter, a sound hardly pronounceable by any human mouth.

LITERATURE. The Russian literature succeeded, as usual, the conversion of the Empire to Christianity. As there is no inducement for strangers to learn the language, for the purpose of perusing works of genius, it is unnecessary to enlarge upon it in a work of this general nature. The elder authors are either writers of annals, or compilers of martyrologies, and lives of saints. Nestor, the earliest historian, also set an example of the latter kind. In recent times the best authors resident in Russia, such as Pallas, and many others, have had recourse to the German language: and little can be expected from the native literature, till the language shall have been reduced to the more precise alphabet, and polished form of other European dialects.

EDUCATION. Education is little known or diffused in Russia, though the court have instituted academies for the instruction of officers and artists.

UNIVERSITIES. The university of Petersburg, founded by the late Empress Catharine II, is a noble instance of munificence, and it is hoped will escape the fate of the colleges, founded at Moscow by Peter the Great, which do not seem to have met with the deserved success.

CITIES AND TOWNS. In considering the chief cities and towns of Russia, Moscow, the ancient capital attracts the first attention.

MOSCOW. This city dates from the year 1300, and is of very considerable extent, and population, though injured by a pestilence in 1771. Prior to this mortality the houses in Moscow were computed at 12,538, and the population at not less than 200,000*. Moscow is built in the Asiatic manner, in which cities cover a vast space of ground.

PETERSBURG. Petersburg, the Imperial residence, is said to contain 170,000 inhabitants; and is the well-known, but surprising erection of the last century. This city has been so repeatedly described, that the theme is trivial. Suffice it to observe that it stands in a marshy situation on the river Neva, the houses being chiefly of wood, though there be some of brick ornamented with white stucco. The stone buildings are few; and Petersburg is more distinguished by its fame, than by its appearance or opulence. The noblest public works are the quays, built of perpetual granite, while we employ perishable free-stone.

* Coxe, Tr. in Poland, i. 351. 8vo. estimates, from good evidence, the population 250,000.

ASTRACAN. Astracan is supposed to stand next to Petersburg in population. This city, near the mouth of the vast river Volga, was the capital of the Tartar kingdom of Capshak; but the churches are chiefly of brick, and the houses of wood. The population is computed at 70,000. Cronstadt in the government of Petersburg, and Kollonna in that of Moscow, are supposed each to contain about 60,000 inhabitants. Cherson in the government of Ecatharinslav, and Caffa in Taurida, are said each to contain 20,000: while 30,000 are ascribed to Tula, 27,000 to Riga, a city of considerable trade and consequence.

EDIFICES. In general the Russian towns are built of wood, and present few remarkable edifices. A cathedral or two, and the royal palaces and fortresses, may deserve a description, better adapted to a book of travels, than to a work of this nature.

INLAND NAVIGATION. The inland navigations of Russia deserve more attention. Among other laudable improvements, Peter the Great formed the design of establishing an intercourse by water between Petersburg and Persia, by the Caspian sea, the Volga, the Mesta, and the lake of Novgorod, &c. but this scheme failed by the ignorance of the engineers, and the emperor afterwards employed Captain Perry, who rather taught the proper manner, than completed any great work. During the long reign of the late empress many canals were accomplished, or at least received such improvements that the chief honour must be ascribed to her administration.

VISHNEI VOLOSHOK. The celebrated canal of Vishnei Voloshok was in some shape completed by Peter, so as to form a communication between Astracan and Petersburg, the course being chiefly afforded by rivers, and it was only necessary to unite the Twertza running towards the Caspian, with the Shlina, which communicates with the Baltic. The navigation is performed according to the season of the year, from a fortnight to a month; and it is supposed that near 4000 vessels pass annually*.

LADOGA. The canal of Ladoga, so called, not because it enters that lake, but as winding along its margin, extends from the river Volkof to the Neva, a space of 67½ miles, and communicates with the former canal. By these two important canals constant intercourse is maintained between the northern and southern extremities of the empire. Another canal leads from Moscow to the river Don, forming a communication with the Euxine; and the canal of Cronstadt forms a fourth. Peter the Great also designed to have united the Don with the Volga, and thus have opened an intercourse between the Caspian and Euxine seas and the Baltic: and the whole empire abounds so much with rivers that many advantageous canals remain to be opened. Some progress was made in a canal from the river Volkof towards the White sea, which would considerably improve the commerce of Archangel.

MANUFACTURES AND COMMERCE. By these means the inland trade of Russia has attained considerable prosperity; and the value of her exports and imports have been long upon the increase. Several manufactures are conducted with considerable spirit†. That of isinglass,

* Phillips, 20, 29. † Tooke, iii. 463, &c.

which is a preparation of the sounds, or air bladder of the sturgeon, flourishes on the Volga, the chief seat also of that of kaviar, consisting of the salted roes of large fish. The manufactories of oil and soap are also considerable; and Petersburg exports great quantities of candles, besides tallow, which abounds in an empire so well replenished with pasturage: nor must the breweries and distilleries be forgotten. Saltpetre is an imperial traffic, and some sugar is refined at Petersburg. There are several manufactures of paper, and of tobacco, which grows abundantly in the southern provinces. Linen is manufactured in abundance, the best comes from the government of Archangel. Cotton is little wrought, but the silk manufactories are numerous: coarse cloths, carpets, and hats are also made in Russia, and leather has long been a staple commodity. The mode of making Russian leather is described with great minuteness by Mr. Tooke*. Shagreen is made of chosen portions of the hides of the horse and ass, impressed with the hard seeds of certain plants, which are trodden in to mark the leather. Russia produces vast quantities of wax which is however, generally exported unbleached; nor are there wanting fabrics of earthen ware and porcelain. Iron founderies abound; and in the northern government of Olonetz is a grand foundery of cannon.

The commerce of Russia was known in the middle ages, by the connection between the Hanse towns, in the north of Germany, and Novogorod, established about 1276. So wide is now this empire, that it maintains a commerce of the most remote descriptions, on the Baltic, and the White sea, the Euxine and the Caspian, with Persia, and with China. The English having, so to speak, discovered Russia in the sixteenth century, the Czar Ivan Basilowitz, delighted with this new intercourse, caused a harbour to be constructed on the White sea, where the English arrived, which was called the harbour of the Archangel Michael, and afterwards, for brevity, Archangel. This commerce continued till Petersburg was founded: yet Archangel still affords a moderate trade, and exports potashes, kaviar, tallow, wax, hides, hemp, &c. with corn, linseed, coarse linens, and other articles. The commerce of Petersburg is much of the same description: that of Riga is very considerable, and to other articles are added masts from the Dnieper. Riga was the capital of Livonia, a province which formerly occasioned many disputes between Russia, Sweden and Poland; but in 1710 was finally subdued by Peter the Great. In general the exports of Russia, by the Baltic, exceed the imports by one third part. The imports of Petersburg in 1797 were computed at about 20,000,000 of rubles, or about 4,000,000*l* sterling. Russia is supposed to export grain annually to the value of 170,000*l*. and hemp, and flax, raw and manufactured, to the amount of a million and a half sterling.

The commerce of the Euxine, or Black sea, is of inferior moment, chief exports, furs, salt beef, butter, cordage, sail cloth, kaviar, corn; with iron, linen, and some cotton stuffs. Imports, wine, fruit, coffee, silks, rice, and several Turkish commodities†. The commerce of the Caspian was known to the Genoese, who, by permission of the Byzantine emperors, had formed a settlement in Crim. The chief Russian

* Tooke, iii. p. 513, &c. † Ibid. 572.

harbours are Astracan, the chief seat of the Caspian commerce, Gurief, and Kisliar. Persian havens are Derbent, Nisabad, and Baku; with Medshetizar, and Farabat on the southern shore of the Caspian. Astrábat opens the trade with Kandahar. From Astracan are exported many European manufactures; and the chief imports are raw silk, rice, dried fruits, spices, saffron, sulphur, and naphtha. The Hindoo merchants occasionally bring gold, and precious stones. The annual trade is computed at 1,000,000 of rubles, or 200,000*l*. That of the Euxine is not above one third of this value.

Russia likewise maintains some commerce by land with Prussia. That with Persia is of little moment; chief imports, silk. There is a considerable trade by land with the Kirguses, who send horses, cattle, and sheep, in return for woolen cloths, iron, and European articles. That with China is nearly on a par; each country transmitting to the amount of about 2,000,000 of rubles (400,000*l*.). Russia exchanges her precious Siberian furs for tea, silk, and nankeen.

The internal commerce of Russia is very considerable; and Siberia is said to afford in gold, silver, copper, iron, salt, gems, &c. to the amount of 12,000,000 of rubles (2,400,000*l*.), that between the southern and northern provinces is also of great extent and value. The coin current in the empire is supposed to amount to about 30,000,000*l*. sterling, the paper money to about 20,000,000*l*. The Siberian gold, and silver supply an important addition to the national currency.

CHAPTER IV.

NATURAL GEOGRAPHY.

CLIMATE AND SEASONS.—FACE OF THE COUNTRY.—SOIL AND AGRICULTURE.—RIVERS.—LAKES.—MOUNTAINS.—FORESTS.—BOTANY.—ZOOLOGY.—MINERALOGY.—MINERAL WATERS.—NATURAL CURIOSITIES.

CLIMATE AND SEASONS. THE climate of Russia in Europe, as may be expected in such a diversity of latitudes, presents almost every variety from that of Lapland, to that of Italy: for the newly acquired province of Taurida, may be compared with Italy in climate and soil. But winter maintains the chief sway at Petersburg, the capital, and the Neva is annually frozen from November to March, or April. Euler has even observed that at Petersburg only two months in the year may be expected to be free from snow: and the climate around the frozen ocean, and the last European isle upon the north-east, that of Novaya Zemlia, or the New Land, is of noted severity, the northern side being encompassed with mountains of ice, and the sun not visible from the middle of October, till February; while it never sets during June and July. Taurida presents, on the contrary, all the luxuriance of the southern year, while the middle regions are blest with the mild seasons of Germany and England.

FACE OF THE COUNTRY. In so wide an empire the face of the country must also be extremely various; but the chief feature of European Russia consists in plains of a prodigious extent, rivalling in that respect the vast deserts of Asia and Africa. In the south are some extensive *Steppes*, or dry and elevated plains, such as that above the sea of Azof, in length about 400 English miles. The numerous and majestic rivers also constitute a distinguishing feature of this empire.

SOIL AND AGRICULTURE. The soil is of course also extremely diverse, from the chilling marshes which border the White and Frozen seas, to the rich and fertile plains on the Volga. The most fertile is that between the Don and the Volga, from Voronetz to Simbirsk, consisting of a black mould, strongly impregnated with saltpetre; that is a soil formed from successive layers of vegetable remains*. The great extent of arable land might be much increased if

* Tooke, i. 67.

industry were more diffused. In Livonia, and Esthonia, the medial returns of harvest are eight or ten fold; and the latter is generally the produce of the rich plains near the Don, where the fields are never manured, but, on the contrary, are apt to swell the corn into too much luxuriance. Pasturage is so abundant that the meadows are little regarded, and the artificial production of grasses is scarcely known. Some of the meadows are watered, and produce large crops of hay; the dry pastures (sometimes opened for grain,) yield a short, but nutritious produce; in a few of the steppes the grass will attain the height of a man, and is seldom mown. In the sylvan age the annual burning of this grass, as practised by savages, may have produced the rich black mould so abundant in some large regions of the empire.

Agriculture is hardly known in the northern parts of the governments of Olonetz, and Archangel; but in the central parts of the empire has been pursued from time immemorial. The Russian plough is light and simple, and scarcely pierces the ground to the depth of two inches; but in the southern provinces a heavier kind is used, resembling the German. In what is called the summer field the corn is sown and reaped in the same year; while in the winter field the corn is sown in autumn, and the produce reaped in the ensuing summer. The former yields what is called summer wheat, and rye, barley, millet, buck-wheat, flax, hemp, pease, &c.; the latter only wheat, or rye: and the winter field is commonly left fallow till the following spring. In general agriculture is treated with great negligence, yet the harvests are abundant: even in the neighbourhood of Petersburg there are large marshes which might be easily drained, and converted into fertile land. In the north rye is most generally cultivated, but in the middle and the southern regions wheat: in the government of Ekatarinoslaf the Arnautan wheat is beautiful, the flour yellowish, the return commonly fifteen fold; nor is Turkish wheat, or maize unknown in Taurida. Barley is a general produce, and is converted into meal, as well as oats, of which a kind of porridge is composed. Millet is also widely diffused; but spelt, or bigg, little cultivated. Rice succeeds well in the vicinity of Kislear. Potatoes are unaccountably neglected, except in the north. This invaluable root bears the cold of Archangel, and yields from thirty to fifty fold. Hemp and flax form great objects of agriculture. Madder, woad, and saffron grow wild in the south. The hop is also cultivated, and is found wild near the Uralian chain, and in Taurida. Tobacco has been produced since the year 1763, chiefly from Turkish and Persian seed. The olive has been tried in vain at Astracan; but prospers in the southern mountains of Taurida along the Euxine. In the gardens are cultivated cabbages, of which a great number is consumed in the form of sour-kraut, and other plants common in Europe. The government of Moscow produces abundance of excellent asparagus; and sugar-melons abound near the Don, and the Volga. Large orchards are seen in the middle and southern parts of Russia, yet quantities of fruit are imported. While apples, and pears are found as far north as the 49°, plums and cherries extend to the 55°. What is called the Kirefskoi apple often weighs four pounds, is of an agreeable flavour, and will keep a long time. A transparent sort from China is also cultivated, called the

Nalivui, melting and full of juice*. The culture of the vine has been attempted in the south, and will certainly, with proper management, succeed in Taurida. Bees are not known in Siberia, but form an object of attention in the Uralian forests, where the proprietors carve their hives to a considerable height in large trees, and they are secured from the bears by ingenious contrivances described by Mr. Tooke. Mulberry trees and silk are not unknown in the south of European Russia.

Rivers. In enumerating the chief rivers of European Russia the first attention is due to the majestic Volga, which forms, through a long space, the boundary between Asia and Europe, belonging properly to the latter continent, in which it arises, and from which it derives its supplies, till at Tzaritzin, about 250 miles from its mouth, it turns south-east into Asia. This sovereign of European rivers derives its source from several lakes in the mountains of Valday, and government of Twer, between Petersburg and Moscow; and bends its chief course to the south-east, till, near its junction with the Kama, an important river fed by many streams from the Uralian chain, it turns towards the south-west till it arrives at Tzaritzin. Its comparative course may be computed at about 1700 miles. This noble river, having no cataracts, and few shoals, is navigable even to Twer: but it is said that the stream has become more shallow even since the commencement of last century. The tributary rivers of the Volga are chiefly from the east, the Kama, which rivals the Volga at their junction, rising in the government of Viatka, and running north-west, afterwards due east, and then south. On the west, the chief stream which runs into the Volga is the Oka, which rises in the government of Orel.

Don. Next to the Volga, on the west, is the Don, or Tanais, which rises from a lake in the government of Tulan, and falls into the sea of Azof, after a course of about 800 miles.

Neiper. The Neiper, or ancient Borysthenes, rises in the government of Smolensk, about 150 miles to the south of the source of the Volga, and about 100 to the south-east of that of the Duna, or Duina, which flows into the Baltic, by Riga; and after a course of about 1000 miles, through rich and fertile provinces, falls into the Euxine. The Bog, or Hypanis, a far inferior stream, falls into the Liman, or estuary of the Neiper.

Neister. The Neister, or ancient Tyras, now forms the boundary between European Turkey and Russia, deriving its source from the north side of the Carpathian mountains, and falling into the Euxine at Akerman, after a course of about 600 miles.

Several important rivers direct their course towards the Arctic ocean, such as the Cara, which though not a considerable river, is yet remarkable, as forming the boundary between Asia and Europe, for the space of about 140 miles, the Uralian chain terminating so far from the sea of Cara-skoi, or Karskoi.

Petshora. The river Petshora rises in the Ural mountains, and joins the Frozen ocean, after a course of about 450 miles.

Next, on the west, is the Mezen, which falls into the White sea after a course of about 350 miles.

* Tooke, iii. 240.

DWINA. The Dwina falls into the gulf of Archangel, after a considerable course of about 500 miles. The Onega closes the list of the chief rivers that flow into the Arctic ocean; for those of Olonetz, and Russian Lapland, are of little consequence.

The Svir joins the lake of Onega with that of Ladoga, which by the Neva, a more important stream, falls into the gulf of Finland.

NEVA. This river, pervading the city of Petersburg, is about forty miles in length, but of considerable breadth and depth, and subject to violent floods, which have been recently guarded against by deepening the bed, and by erecting strong quays of granite.

The Narva also runs a short course from the Tchudskoi, or Peypus lake, into the Finnish gulf. The Pernof rises some miles to the west of the Peypus lake, and falls into the gulf of Riga.

DUNA. But the most considerable stream in this quarter is the Duna, whose source has been already mentioned. It has some considerable and dangerous falls; and sometimes greatly injures the city of Riga, at the breaking up of the ice. Its course is about 500 miles.

NIMEN. The Nimen now forms a part of the boundary between Russia and Prussia, and is joined by a canal to the river Pripaz, which falls into the Neiper; but the cataracts in the latter river, about 250 miles above its estuary, greatly impede the intercourse that might thus be established with the Euxine.

LAKES. The chief lakes of European Russia, are situated in the north-west division of the empire. There is a considerable lake in Russian Lapland, that of Imandra; to the south of which the government of Olonetz presents many extensive pieces of water, particularly the large lake of Onega, which is about 150 miles in length, by a medial breadth of about thirty. The islands and shores of the Onega are chiefly calcareous, and contain some valuable marbles. To the west is the Ladoga, about 130 miles in length, by 70 in breadth, being one of the largest lakes in Europe. As it has many shoals, and is liable to sudden and violent tempests, Peter the Great opened a canal along its shore, from the Volkof to the Neva. The fishery of this lake seems of little consequence; but the northern shores produce the beautiful Finnish marble, which is much used at Petersburg.

PEYPUS. On the south-west we find the lake of Peypus, about 60 miles in length by 30 in breadth: the northern part of this lake is styled that of Tshud, the south that of Pscove. From the Peypus issues the river Narova, or Narva, and there is an island, with three villages, called Bolka. Fish abound, particularly a kind which resembles the herring; barbel, pike, perch, carp, and others. To the east is the lake Ilmen, on which stands the ancient city of Novogorod. The Bielo, or White lake, is so called from its bottom of white clay. The lake of Coubenskoi, and a few others to the north-east are of inferior note.

But the lakes that give rise to the famous Volga must not be omitted. The chief of these is the lake Seliger, in the government of Twer, which, though narrow, extends about thirty miles in length; and a smaller lake, not far to the west, emits another source of that august river.

MOUNTAINS. It has already been mentioned that European Russia is rather a plain country, though some parts of it be greatly elevated, such as that which sends forth the three rivers of Duna, Volga, and Nieper. This region, which is passed in travelling from Petersburg to Moscow, is by some called the mountains of Valday, from the town and lake of Valday, situated on the ridge; but by the natives it is styled *Vhisokaya Plostchade*, or elevated ground; and no mountains are here delineated in the common maps. In this quarter the ground is strewed with masses of granite, but the hills are chiefly marl, sand, and clay; and what are called the mountains of Valday seem to be a high table land, surmounted with large sand hills, and interspersed with masses of red and grey granite, with hornblende, shorl, and steatites: near Valday is the highest part of the ridge, which seems to be in a north-east and south-west direction. The hills, lakes, and groves are beautiful; and there is an island with a noble monastery. To the south of Valday the masses of granite become smaller, and more rare; and calcareous petrifactions appear, which are followed by the clay near Moscow. Some suppose the uplands of Valday to be an extension of the mountains of Olonetz, passing between the lakes Onega and Ladoga, and afterwards between those of Ilmen and Seliger; where is the chief ridge, and which seems to present the ruins of what was once a granitic chain. Mr. Tooke* computes the highest point of the Valday at only 200 fathoms above the level of Petersburg, about 1200 feet above the sea: the height is inconsiderable, and gives a striking impression of the gentle and plain level, through which such extensive rivers must pursue their course. The woods on the Valday are chiefly pine, fir, birch, linden, aspen, and alder: soil in the vales, fertile, mostly clay and marl.

From the Valday towards the south scarce a mountain occurs; but after passing the steppe of the Nieper, an arid plain with salt lakes, which indicate the extent of the Euxine at remote periods, we arrive at the mountains of Taurida, which are rather romantic than of remarkable height, being calcareous and alluvial. To the south of this chain, along the shores of the Euxine, are the beautiful vales, so well described by Pallas, productive of the laurel, the olive, the fig, and the pomegranate, while the arbutus adorns the steepest cliffs with its red bark, and foliage of perpetual green. The caper and the vine also abound in this natural orchard: and the flocks of sheep and goats feeding on the hills, or bounding from the rocks, unite with the simple and good humoured manners of the Tartar inhabitants, to render the scene truly pastoral.

OLONETZ. But the most important chains of mountains in European Russia remain to be described: those of Olonetz in the furthest north, and those of Ural which separate Europe from Asia. The chain of Olonetz runs in a direction almost due north, for the space of 15° or about 1050 miles. The most arctic part is said to consist chiefly of granite, gneiss, petrosilex, and schistose lime-stone; and is not of great height, but retains perpetual snow from the altitude

* Vol. i. 130.

of the climate. More to the south, branches stretch on the east towards the gulf of Kandalak: the granite is intermixed with large sheets of talc, and patches of trap are found, particularly near the gold mines of Voytz, on the western side of the river Vyg. Various other ores occur in this region, and veins of copper pyrites appear in the trap. Towards the lakes of Onega and Ladoga, the calcareous rather preponderates, as already mentioned.

In the centre, between the mountains of Olonetz and those of Ural, there seems to be a considerable chain extending from the east of Mezen to the Canin Nos, a bold promontory which rushes into the Frozen ocean; but this chain appears to have escaped the searches of curiosity or avarice, by the perpetual snows with which it is enveloped. The immense Uralian chain extends from about the 50th to near the 67th degree of north latitude, or about 1150 miles in length, and has by the Russians been called *Semenoi Poias*, or the girdle of the world*, an extravagant appellation, when we consider that the chain of the Andes extends near 5000 miles. Some modern authors have imagined that this chain is the same with the Riphæan mountains of antiquity; which, on the contrary, as appears from Ptolemy and others, ran from east to west near the head of the Tanais or Don, and must of course have been only a forest running through the centre of Russia, as the ancients often confounded mountains and forests under the same appellation. Pauda, one of the highest mountains of the Uralian chain, is reported by Mr. Gmelin to be about 4512 feet above the level of the sea, an inconsiderable height, when compared with M. Blanc or M. Rosa. The central part of this chain abounds in metals, from Orenburg on the south to the neighbourhood of Perm, where on the Asiatic side are Venchoutury on the north, Ekatarinenburg on the south, places remarkable for opulent mines. The highest ridges are chiefly granite, gneiss, and micaceous schistus, while the exterior hills of the chain on the west are as usual calcareous. Serpentine, jasper, and trap, are also found, with argillaceous schistus, and other varieties, to be expected in so long a chain. The woods are chiefly pine, fir, birch, cedar, larch, aspin, alder, and on the south-west sides are a few oaks, elms, and lindens.

Forests. European Russia is so abundant in forests that it would be vain to attempt to enumerate them. There are prodigious forests between Petersburg and Moscow, and others between Vladimir and Arzomas. Further to the south there seems to have been a forest of still greater extent, probably as already mentioned the Riphæan forest of antiquity, in the direction of the rich black soil so remarkable for its fertility†.

Botany. When we consider the vast extent of territory comprehended under the European sovereignty of Russia, from the frozen

* Pennant, A. Z. i. 158.

† Mr. Coxe, Travels in Poland, &c. vol. i. 323, 341, describes the vast forest of Volkonski, as beginning near Viasma, and continuing almost to the gates of Moscow, as he travelled through it without interruption for 150 miles. He says that the Volga, Duna, and Dnieper arise in this immense forest, which consists of oaks, beech, mountain-ash, poplar, pines, and firs, mingled together in endless variety.

shore of Archangel to the delicious climate of the Crimea, and that the whole of this great empire has scarcely produced a single naturalist of any eminence, all that is known of its vegetables, animals, and minerals, being collected for the most part within the last forty years by a few foreigners, under the munificent patronage of Catharine II. it will be evident that the rudiments alone of the Russian flora can as yet be extant. The provinces bordering upon the Baltic, and the newly acquired government of Taurida, have been examined with some attention, and a few striking features of the botany of the interior of the country have been described by travellers: but many years of patient research must elapse before the natural history of Russia is advanced to an equal degree of accuracy with that of the western parts of Europe.

The Russian provinces north of the Baltic, contain the same plants as those of Swedish and Norwegian Lapland, which will be hereafter described. Such as extend between the 50th and 60th degrees of lat. abound principally in the common vegetables of the north of France and Germany, some of which, however, are wanting, on account of the greater severity of the Russian winters from their proximity to the vast plains of Tartary and the forests of Siberia. The trees of most use and in greatest abundance are Pinus abies, *the fir;* P. sylvestris, the *Scotch pine;* P. picea, the *yew-leaved fir;* and P. larix, the *larch:* all of which mingled together, form the vast impenetrable forests, whence the rest of Europe is principally supplied with masts, deals, pitch, and tar. The other forest trees are the Ulmus campestris, the *elm;* Tilia Europæa, the *lime*, of the inner bark of which the Russian mats are made, and from whose blossoms the immense swarms of wild bees collect the chief part of their honey; Betula alba, *the birch;* B. alnus, the *alder;* Populus tremula, the *aspen;* Acer platanoides, the *greater maple;* and A. pseudo-platanus, the *sycamore:* of the shrubs and humbler plants, those of most importance are Sorbus aucuparia, *mountain-ash*, from whose berries by fermentation and distillation an ardent spirit is obtained; Rubus chamœmorus, the *cloudberry;* Vaccinium oxycoccos, the *cranberry;* Arbutus uva ursi, the *bearberry;* and Rubus saxatilis, the *stone bramble;* the fruit of all which, for want of better, is highly esteemed, and is either eaten fresh or is preserved in snow during the winter: Cornus herbacea, the *dwarf cornel;* Angelica archangelica, the *Angelica*, whose succulent stalks when candied form a favourite conserve with most of the northern nations: Juniperus communis, the *juniper;* as well as the following vegetables, most of which are either found only in our flower gardens, or are of rare occurrence in a truly wild state in Britain; Menyanthes nymphoides, *fringed water-lily;* Campanula pyramidalis, *pyramidal bell-flower;* Malva alcea, the *holly-hock;* Dracocephalum moldavica, *Moldavian balm;* Oenothera biennis, *evening primrose;* Nigella arvensis, *fennel-flower;* Daphne mezereum, *mezereon;* Anemone hepatica, *hepatica;* Linnæa borealis; Calla palustris; and Fumaria bulbosa, *bulbous-rooted fumitory.*

Quitting the pine forests of the north and middle of Russia, if we turn our attention to the few vegetable productions that have as yet been noticed amidst the myriads that adorn and enrich the broad vales

of the Don and the Dnieper, that glow upon the warm shores of the Black Sea, or luxuriate in the delicious recesses of Taurida, we shall see what a rich harvest is reserved for future naturalists, and with what ease the inhabitants, when once become civilized, may avail themselves of the uncommon bounties of their soil. Here rises in stately majesty for future navies, the oak, both the common kind and the species with prickly cups, Quercus cerris; the *black* and the *white poplar*, Populus nigra and alba, of unusual size, skirt along the margins of the streams: the *ash*, Fraxinus excelsior; the *horn-beam*, Carpinus betulus; the *nettle-tree*, Celtis australis; occupy the upland pastures, and the elegant *beech*, Fagus sylvatica, crowns the summits of the lime-stone ridges. Of the fruit-bearing shrubs and trees, besides the various species of ribes, the *gooseberry*, the *red*, the *white*, and the *black currant*, which are dispersed in abundance through the woods, there are Amygdalus communis and persica, the *almond*, and *peach*; Prunus armeniaca and fruticosa, the *apricot* and *crab-cherry*; Mespilus germanica, the *medlar*; Juglans regia, the *walnut*; Morus Tatarica, nigra, and alba, the *Tartarian*, *black* and *white mulberry*; Olea Europæa, the *Olive*; Pistachia terebinthus, the *Chio turpentine-tree*; Corylus avellana, the *hazle nut*; Berberis vulgaris, the *barberry*; Ficus carica, the *fig*; Vitis vinifera, the *vine*; and Punica granatus, the *pomegranate*. Of the ornamental shrubs and plants, the following are the most distinguished, Elæagrus angustifolius; Amygdalus nana, the *dwarf almond*; Prunus laurocerasus, the *laurel*; Mespilus pyracantha, the *pyracantha*; the elegant spiræa crenata; Lonicera tatarica, the *Tartarian honeysuckle*; Robinia frutescens, the *shrubby robinia*; Juniperus sabina, *savin*; Laurus nobilis, the *bay-tree*; Jasminum officinale and fruticans, the *common and shrubby jasmine*; Rhus coriaria, the *sumach*; and Tamarix pentandra, the *tamarisk*.

Zoology. The zoology of Russia is vast and various, and only a very slight sketch can here be attempted. The more peculiar animals are the sea bear of Novaya Zemlia, and the souslik of the south. In the more northern parts are found the wolf, the lynx, the elk; nor is the camel unknown in the lower latitudes. The animals in the centre seem common to the rest of Europe. Among the more useful animals the horse has met with deserved attention, and the breed in many parts of the empire is large, strong, and beautiful. Near Archangel are found poneys, or small horses, as in the northern latitudes of the British dominions; but Lithuania produces steeds of great strength, while those of Livonia excel in speed; the spirit and beauty of the Tartarian horses have been long celebrated, and have been improved in Taurida by the introduction of Turkish and Arabian stallions. Yet numbers of horses are annually imported at Petersburg.

Even the country near Archangel is remarkable for excellent pasturage and fine cattle, which may be said in general to abound in the empire. The sheep in the northern provinces are of a middle size, short tailed, and the wool coarse; nor is proper attention paid towards improving the breed. Those in the south are long tailed, and yield a superior wool; but the best is from the ancient kingdom of Kazan, and other regions in the east of European Russia. The islands of Oesel and Dagho have an excellent breed, with wool equal to the

English. In Taurida it is said that common Tartars may possess about 1000 sheep, while an opulent stock is computed at 50,000: those of the whole peninsula were supposed to amount to 7,000,000. The mutton excellent, but the wool coarse, though the lambs' skins be valued for their fur. Goats and swine also abound throughout European Russia; nor is the rein-deer unknown in the furthest north; so that the empire may be said to extend from the latitude of the rein-deer to that of the camel.

MINERALOGY. The chief mines belonging to Russia are in the Asiatic part of the empire, but a few are situated in the European, in the mountains of Olonetz; and there was formerly a gold mine in that region near the river Vyg. In the reign of Ivan Basilowitz, the English in 1569, obtained the privilege of working mines of iron, on condition that they should teach the Russians this metallurgy. During the reign of Alexis, the first regular mines were established in Russia, about sixty miles from Moscow, and they are still continued: but Peter the Great was the founder of the Russian mineralogy, by the institution of the college of mines in 1719; and copper and iron was successfully wrought in the territory of Perm. About 1730, the rich mines began to be discovered in the Asiatic part of the empire, the description of which is reserved for the second volume of this work. In 1739, gold was first observed in the chain of Olonetz, as already mentioned; and the mines of Voytzer near the Vyg were opened, but with little success, as they only yielded about fifty-seven pounds of gold in the year, which hardly recompensed the price of labour*. This noble metal seems to require the full power of the sun; and gold mines have rarely succeeded at a distance of more than 50° from the equator.

MINERAL WATERS. European Russia being a plain country, can boast of few mineral waters. There is a hot spring near Selo Klintschy, in the government of Perm: and a noted chalybeate in the village of Buigova in the district of Olonetz, called St. Peter's Well, by Peter the Great, who erected near it some houses and a church. The soil is so strongly impregnated with iron, that roots of trees and other vegetable substances have been often found, converted as it were, into ores of that metal. But the most celebrated is near Sarepta on the Volga, discovered in 1775. The springs are here numerous and copious, and strongly impregnated with iron. In the district of Perekop, and on the isle of Taman, belonging to the government of Taurida, there are springs of Naphtha†.

NATURAL CURIOSITIES. The natural curiosities of Russia in Europe have scarcely been enumerated, except those which indicate the severity of winter in so northern a clime. Not to mention the rocks of ice, of many miles in extent and surprising height, which navigate the frozen ocean, adorned like cathedrals with pinnacles, which reflect a thousand colours in the sun, or Aurora Borealis: it is well known that the empress Anne built a palace of ice, on the banks of the Neva, in 1740, which was fifty-two feet in length, and when illuminated had a surprising effect. The thirteen cataracts of the

* Tooke, iii. 402, &c. † Ibid. i. 283.

Neiper, about 3000 miles above its estuary, are composed of successive banks of granite, which project through the bed of the river; and in the government of Olonetz other curious cataracts may be found. In the same region, near those mountains which abound with iron, are found various fragments of birch trees and other vegetables, mineralized by that metal, while the texture of the wood remains visible, and the tender white rind, which strongly resists corruption, preserves its original appearance. The soil is changed into ferruginous earth, the grassy sod becomes iron ore*.

* Tooke, i. 109.

RUSSIAN ISLES.

THE small isle of Cronstadt, in the gulf of Finland, was formerly called Retusavi, and is only remarkable for an excellent haven, strongly fortified, the chief station of the Russian fleet. In the Baltic, Russia also possesses the islands of Oesel, and Dago, which are of a considerable size, but full of rocks: the marble of the first island is however beautiful. Both isles are chiefly peopled by Estonians.

There are several isles near the shore of Russian Lapland, and in the White sea, but generally barren and uninhabited rocks.

NOVAYA ZEMLIA. Novaya Zemlia, or the New Land is also uninhabited, and is said to consist of five isles, but the channels between them are always filled with ice*. Seals, walruses, arctic foxes, white bears, and a few rein-deer, constitute the zoology of this desert; and are occasionally hunted by the people of Mezen. To the south of Novaya Zemlia is the sea of Cara, (Karskoye) in which the tide flows about two feet nine inches.

SPITZBERGEN. The remote and dreary islands of Spitzbergen, having been taken possession of by the Russians, they may be here briefly described. This country has by some been styled New Greenland, a name which accurately belongs to the western side of Greenland proper, in North America, while the eastern side is called Old Greenland, as having been anciently planted by the Danes, though since blocked up by ice. The main land of Spitzbergen extends about 300 miles, from the south cape, lat. 76° 30′, to Verlegan-Hook, lat. 80° 7′. In an adjacent small isle are said to be basaltic columns, from eighteen to twenty inches in diameter, and mostly hexagonal†. Drift wood is frequent in these northern latitudes, partly perhaps from the banks of the Ob, and partly from America, there being a strong current from the West Indies to the north-east. Spitzbergen is supposed to have been first discovered by the Dutch navigator Barentz in 1596. The mountains are of granite and grit, the highest not exceeding 4000 feet; for mountains in general decline in height towards the

* Pennant, Arc. Zool. clx. † Ibid. cxxxii.

poles. The icebergs, or glaciers, in the north-east of Spitzbergen, present a singular appearance, being high cliffs of an emerald colour, impendent over the sea, with cataracts of melted snow, and a back ground of black conic hills streaked with white. The sea itself contains mountains of ice, formed by aggregation; a large field forcing a smaller out of the water till it lodge upon the superior surface, and the height is afterwards increased by the snow, till it sometimes rise to 1500 feet. The snow in these high latitudes often falls as hard, and minute as fine sand. About the first of November the sun sets, and appears no more till the beginning of February; and after the beginning of May, it never sets till August. Coals are found in Spitzbergen, but even the vales are covered with eternal ice or snow. The only tree is the dwarf willow, which rises to the height of two inches, towering with great pride above the mosses, and lichens, and a few other cumbent plants. Here are found polar bears, foxes, and rein deer, with walruses, and seals. There are a few kinds of water fowl; but the whale is the lord of these shallow seas. The Russians from Archangel maintain a kind of colony; and that northern region seems indeed to have a natural right to Spitzbergen. To the north-east of this dreary groupe are the small isles, called the Seven Sisters, the most arctic land yet discovered; and the dangers which Mr. Phipps, afterwards Lord Mulgrave, suffered near the Seven Sisters are well described in the account of his voyage.

AUSTRIAN DOMINIONS.

CHAPTER I.

HISTORICAL GEOGRAPHY.

NAMES.—EXTENT.—BOUNDARIES.—ORIGINAL POPULATION.—PROGRESSIVE GEOGRAPHY.—PRESENT BOUNDARIES.—HISTORICAL EPOCHS AND ANTIQUITIES.

THE dominions subject to the house of Austria embrace many ancient kingdoms and states, which, for the sake of perspicuity, are here brought under one point of view; it having been urged as a reproach to modern geography, that by the obstinate retention of antiquated divisions, and the confused minuteness of separate descriptions, it has not made an uniform progress with modern history, and politics, which it ought to illustrate. Hence, to use the present instance, many are led to imagine that the power of the house of Austria is chiefly founded on bearing the Imperial title, whereas, if reduced to the regal style of Hungary, its hereditary domains entitle it to rank among the chief European powers, being of wide extent, and great importance, and boasting a population of not less than 20,000,000, more concentrated than the diffuse population of Russia, and perhaps the next power to France, not in arms only, but on the broad and deep-rooted basis of compact numbers of inhabitants.

In describing a sovereignty, thus composed of many ancient states, it may seem proper to pay the first and chief attention to that part which gradually spread its dominion over the rest, or in other words, that which was the earliest important inheritance of the ruling family. The remaining provinces will of course be considered in proportion to

their real and lasting importance; while the more minute districts may be abandoned to the sedulous care and microscopic labour of the topographer. On this plan the provinces that will here require particular observation, are the archduchy of Austria; the kingdoms of Hungary, and Bohemia; the grand-duchy of Transylvania, which, with the Buckovina, may be regarded as belonging to Hungary; the dominion towards the Adriatic, with the acquisitions of Venice, Dalmatia, and lastly, that part of Poland which has fallen under the Austrian sceptre.

NAMES. The archduchy of Austria may be considered as belonging, in part, to ancient Pannonia, the Vindobona of the Romans being the modern Vienna. But that half of Austria, which lies north of the Danube, was occupied by the Quadi, a barbaric nation, who anciently infested the adjoining provinces of Pannonia and Noricum; for the western part of Austria, on the south of the Danube, falls under the latter ancient appellation. The German name and division of Osterich*, or the eastern kingdom, softened into Austria by the Italian and French enunciation, arose after Charlemagne had established the western empire, being a remnant of the sovereignty of what was called Eastern France, established by that conqueror. It was also styled *Marchia Orientalis*, the eastern march, or boundary: and after the failure of the Francic line became a marquisate, feudatory to the dukes of Bavaria, till the emperor Frederick Barbarossa, in 1156, constituted it a duchy held immediately of the empire†. Hungary, a part of which belonged to ancient Dacia, derives its modern appellation from the Ugurs, a nation of Turcomanic, or Tartaric origin, who, after spreading devastation through a great part of Germany, fixed their residence here in the tenth century; the writers of the middle ages, confounding their real appellative with that of the Huns, a different, and here extinguished nation, who had formerly possessed this province. In the time of Charlemagne it was possessed by the Avars, a Slavonic people‡. The Hungarians style themselves Magiar; and their language approaches the Finnic dialect. Bohemia, or the habitation of the Boii, was a central province of barbaric Germany, afterwards seized by a Slavonic tribe, whose chiefs were originally styled dukes of Bohemia. Transylvania, and the Buckovina|| are parts of the province of Dacia, founded by Trajan. The former is by the Hungarians called Erdeli: by the Germans Sieben-burgen, or the Seven towns, from a colony there established: the more common name seems derived from the woody passes of the Carpathian mountains, and was imposed by the monkish writers. Venice, as is well known, derives its appellation from the ancient Veneti of the opposite

* Several of the German names of Austrian provinces differ considerably from our appellations: Carinthia is *Carnten* (Brown, 125); Carniola, *Krain*; Stiria, *Steyermark*; Croatia, *Crabaten*; Bohemia, *Boehmen*; Moravia, *Mæhren*. Galitz, or Galitzia is wrongly styled Galicia.

† D'Anville, Etats formés en Europe, p. 51.

‡ Gibbon, x. 204.

|| This province became subject to Austria in 1777, and was annexed to Galitz. Inhabitants about 130,000, who speak Polish, and German: religion, Roman Catholic.

shore. The origin of the other names becomes difficult, in exact proportion to their unimportance; and is more fit for the investigation of the antiquary, than for the present design.

EXTENT. From the frontiers of Swisserland, to the utmost limits of Transylvania, the length of the Austrian dominions may be about 760 British miles; the breadth about 520, from the river Bug, which forms a boundary between Austria and Prussian Poland, to the Save, which divides the Austrian from the Turkish sovereignty. The acquisition of Venetian Dalmatia may probably soon be followed by the junction of those Turkish provinces, which divide that province from the Austrian domain. The square contents may be about 184,000 miles. Boetticher estimates the inhabitants at 108 to a square mile; but since he wrote, the Netherlands, a populous region, seem to be withdrawn from the house of Austria, yet the Venetian territories display a population little inferior.

Towards the east, the Austrian dominions border on those of Russia and Turkey, and to the north on those of Prussia, Upper Saxony, Bavaria,* and Swabia. On the utmost west, are Swisserland and Italian states.

ORIGINAL POPULATION. The original population of these extensive regions is various, but chiefly Gothic and Slavonic. The native ancient Germans, a Gothic race, form the ruling, most industrious, and most important part of the inhabitants. Bohemia and Moravia were originally Slavonic kingdoms; and the people of Poland and Hungary may be generally referred to the same origin; for in the latter kingdom the Magiars, or Ugurs,† who use a dialect approaching the Finnish, did not supplant the Slavons, whom they found in the country, and who, on the fall of the Roman empire, had succeeded the Dacians, a Gothic race. The Venetians and adjacent Italians, may be considered as genuine descendants of the Cisalpine Gauls, and of the Roman colonies established amongst them. In ancient descent no genealogy can vie with that of several Venetian families, which can be traced by history and record to the eighth century.

* Since 1779 the boundary between Austria and Bavaria is the river Inn, with part of the Salza, a small district being acquired by Austria, which is called the Inn-Viertel.

The county of Gorz, with some surrounding territory extending to the west of the river Judri, is called Friaul, or the Austrian Friulese, in the maps published at Vienna, 1796. With the Venetian territory, Austria acquired the isles in the Adriatic, and the coast from Zara to Narenta, &c. The isle of Veglia is of small account. Cherso, and Osero, being only divided by a narrow strait, are regarded as one isle, woody and fertile: Pago is barren: Isola, Grossa, and some of the others more fertile: Lesina is remarkable for the fishery of *Sardines;* Curzola served the Venetians as an arsenal of ship timber Meleda, and some smaller isles, belong to the republic of Ragusa. The description of Dalmatia by the Abbé Fortis, is feeble, confused, and prolix: the best is that by Lucius, Amst. 1668 fol. which also contains the original historians. The perpetual custom of modern travellers in pursuing beaten routes, prevents many discoveries, and obstructs the progress of geography. Of this coast for instance, and the west of Greece, our knowledge remains imperfect.

† Whence perhaps the terrible *Ogres*, and *Ogresses* of heraldry, which commenced soon after the cruel incursions of these people.

PROGRESSIVE GEOGRAPHY. The progressive geography of the southern part of the Austrian dominions commences at an early period. Yet the Adriatic was not a favourite sea of the Greeks; and the Roman writers throw the first steady light upon these regions. Passing from Cisalpine Gaul, in defiance of the barriers of the Rhætian, and Carnic, or Julian Alps, now the mountains of Tyrol, Carinthia, and Carniola, the Roman generals subdued many barbarous tribes; and founded the provinces of Noricum, and Pannonia, their most northern acquisitions in this quarter, till Trajan added Dacia. The Rhætians were subdued by Drusus, in the reign of Augustus, under whose sway, or rather in the time of his successor Tiberius, Pannonia and Noricum also became provinces of the Roman empire. Concerning those regions much information may be derived from the luminous page of Tacitus; and soon after, the geography of Ptolemy opens additional illustrations. The common resources of ancient geography are continued by the Byzantine writers; and, after the age of Charlemagne, by many historians of the west. Since the invention of printing to the present period, the geography of these extensive provinces has been gradually improved, though not with the rapidity which might have been expected, as they unfortunately have not produced many men of acute genius, extensive learning, or exact science, and the best accounts are derived from writers in the north of Germany, or from foreign travellers*.

HISTORICAL EPOCHS. The historical epochs of various kingdoms and states, recently united under one sovereignty, must of course be subdivided into their original distinct portions, beginning in the order above-mentioned, with the first important state, around which, as a nucleus, the others are conglomerated; but proceeding thence to the other provinces, according to their modern extent and importance.

1. The house of Austria, which by successive fortunate marriages since the fifteenth century, has arisen to such a summit of power, is well known to have sprung from the humble counts of Hapsburg. Those lords possessed a small territory in Swisserland, in the northern corner of the canton of Bern, near the river Aar, about three miles south of the town of Bruck, and the same distance to the north of Mellingen†. On a lofty eminence, crowned with beech, stands an ancient tower, the first seat of the house of Austria. In the twelfth century, Otho is designed count of Hapsburg, and even heraldry anc scarcely ascend beyond his grandsire Radebot, brother of Werner, bishop of Strasburg. In 1273 Rodolph of Hapsburg was called to the imperial throne, after an inter-reign, during which the German potentates had increased, and secured their own power; and wisely preferred a nominal sovereign, whose humble extract, and small possessions, could afford no check to their ambition. Yet Rodolph was at this time lord of the greater part of Swisserland; after the extinction of the powerful house of Zaeringen, and that of the counts of Kyburg, whose joint

* Even one of the last maps of Hungary, that by the Artarian society, Vienna, 1792, is meanly executed, and very defective in displaying the chains and altitude of mountains, which are laid down as they might have been a century ago.

† Coxe's Swisserland, i. 135.

inheritance devolving to Rodolph, became the basis of his power, and that of his successors*.

2. Another emperor of the house of Austria appeared in Albert, A. D. 1298; from whom the Swiss made their signal revolt in 1307. His son Frederic was obliged to yield the empire to Louis of Bavaria.

3. Albert II duke of Austria, A. D. 1438, succeeded to three crowns, on the death of his father-in-law the emperor Sigismond, those of Hungary, and Bohemia, and that of the empire by unanimous election. This was the epoch of the lasting grandeur of the house of Austria. Yet his successors Frederic III, and Maximilian I, were feeble princes; and Charles V first astonished Europe with a real display of Austrian power.

4. Maximilian having married the heiress of Burgundy, the Netherlands became subject to the house of Austria in 1477; and his son Philip, in 1496, marrying the heiress of Arragon and Castile, the ample dominions of Spain fell afterwards under the Austrian sceptre. Charles V inherited all these domains; but on his resignation, Spain and the Netherlands passed to his son Philip II, and the former crown continued in the Austrian line till the close of the seventeenth century. Austria, Bohemia, and Hungary, passed to Ferdinand the brother of Charles V, who was also chosen emperor of Germany.

5. The noted bigotry of the house of Austria was not confined to the Spanish branch, for though Maximilian II, about 1570, had granted liberty of conscience even to the protestants of Austria, yet those of Bohemia, and other parts, were afterwards so much oppressed, that the protestant princes of Germany called in Gustaf Adolf, the celebrated Swedish monarch, to their assistance, who shook the empire to its very foundations. Even France supported the protestants, in the view of weakening the Austrian power; and the war continued till 1648, when the famous treaty of Westphalia was signed, which has served as a basis for other diplomatic transactions.

6. The war with France was often rekindled during the long reign of Leopold I, 1658, to 1705: and in 1683 the Turks were so successful as to lay siege to Vienna.

7. His son Joseph I joined the allies against France, and shared in their success. He married the daughter of John Frederic duke of Hanover.

8. By the death of the Emperor Charles VI, on the 20th October, 1740, without male issue, the house of Austria became extinct. The elector of Bavaria seized the kingdom of Bohemia, and was elected emperor in 1742, but died in 1745.

9. Francis of Lorrain, son of Leopold duke of Lorrain, having married Maria Theresa, daughter of the emperor Charles VI, succeeded to the Austrian dominions, which continue to be held by his descendants. In 1745 he was elected emperor, and his successors have enjoyed the imperial crown, as if hereditary. The powerful house of Lorrain is of great antiquity, descending from Gerard, count

* Planta's Swiss. i. 170.

of Alsace, in the eleventh century, whose origin is referred to a collateral branch of the house of Austria.

10. The reign of the emperor Joseph II, a beneficent but impetuous prince, whose grand designs of reformation were frustrated by his ignorance of the inveteracy of habits and prejudices, which must ever be considered in a due estimate of human affairs.

11. The obdurate and sanguinary contest with France, the events of which are known to all.

Having thus briefly marked the chief epochs of the Austrian power, the events of the subject kingdoms and states must be as much compressed as possible. The next in importance are those of the kingdom of Hungary.

1. The Roman province of Dacia. The conquest by the Huns; and afterwards by the Avars, and other Slavonic tribes.

2. The conquest by the Ugurs, or the Magiars, who continued under dukes from their first settlement in 884.

3. St. Stephen, first king of Hungary, A. D. 1000. The crown is partly elective, and partly hereditary; and among the chief historical events are the wars in Dalmatia, against the Venetians.

4. Louis I, surnamed the Great, A. D. 1342, subdues a great part of Dalmatia, and carries his arms into Italy. He was succeeded by his daughter Mary, who was styled *King* of Hungary; but dying 1392, the succession became controverted, and at last terminated in the election of Sigismond, marquis of Brandenburg, who had wedded Mary the heiress. In 1411 he was chosen emperor of Germany.

5. Albert of Austria having wedded Elizabeth the heiress of Sigismond, was, with her, crowned king and queen of Hungary, 1438: an event which forms the earliest basis of the Austrian claim to the Hungarian monarchy. Upon the death of Albert, Ladislas, king of Poland, is also chosen king of Hungary, but perishes in the battle of Werna against the Turks. The famous John Hunniades is appointed regent of the kingdom.

6. On the death of another Ladislas, the posthumous son of Albert of Austria, in 1457, the celebrated Mathias Corvinus, son of Hunniades, is proclaimed king of Hungary by the states, assembled in the plain of Rakos, near Pest. In 1485 he siezed Vienna, and the other Austrian states, and retained them till his death in 1490. Mathias was the greatest prince who had ever held the Hungarian sceptre, brave, prudent, generous, the friend of arts and letters, and a man of letters himself. He founded a magnificent library at Buda, and furnished it with the best Greek and Latin books, and many valuable manuscripts.

7. After repeated contests, the house of Austria again fills the throne of Hungary, in the person of Ferdinand, 1527; but, towards the end of his reign the Turks seized on the greater part of this kingdom. On his being chosen emperor of Germany, Ferdinand retained the crown of Hungary till 1563, when he resigned it to his son Maximilian; and it has since, continued a constant appanage of the house of Austria.

The grand duchy of Transylvania was considered as a part of Hungary till 1540, when, in consequence of a treaty between the Vaivod, and Ferdinand of Austria, Transylvania began to be regarded as a distinct state. Stephen Battori having been elected prince of Transylvania in 1571, that family continued to hold this petty sovereignty till 1602, after which it continued subject to several elective princes, of whom the most distinguished was Bethlem Gabor, or Gabriel Betlem, a noble Hungarian, and a Calvinist, who conquered a great part of Hungary in 1619, and died in 1629. The last prince of Transylvania was Michael Abaffi, the second of that name, who yielded the sovereignty to the emperor in 1694, since which period this country has formed a part of the Austrian dominions.

The historical epochs of the kingdom of Bohemia deserve more attention.

1. In the seventh century, the Slavons seizing on Bohemia were ruled by chiefs, or dukes, seemingly hereditary, at least after Borzivoi, who embraced Christianity in the year 894. In the eleventh century, Bretislas subdued the little adjacent kingdom of Moravia.

2. Vratislas duke of Bohemia is honoured with the regal title, by the emperor Henry IV, in 1086; who at the same time invested him with the domains of Lusatia, Moravia, and Silesia. But this dignity was personal; and the constant title of king, only dates from Premislas II in 1199. He and his immediate successors, are styled Ottocari, from their zeal in the cause of the emperor Otto.

3. One of the most renowned monarchs was another Premislas Ottocar, who ascended the throne in 1253, seized Austria, and Stiria, and other provinces to the south, and carried his arms into Prussia. In 1271 he refused the imperial crown, which was afterwards given to Rodolph count of Hapsburg, who insisting on the restitution of the Austrian states, Ottocar said that he had paid Rodolph his wages, and owed him nothing: for that count had been his mareschal, or master of the horse. A reconciliation was effected by matrimonial alliances, and by Ottocar's receiving the investiture of Bohemia, and Moravia, and renouncing Austria, Stiria, and Carinthia. His son Wenceslas was elected king of Poland: but refused the sceptre of Hungary in favour of his son.

4. The ancient lineage having failed, John count of Luxembourg, who had married a daughter of Bohemia, became king in 1310, and was slain at the battle of Creci, fighting against the English, in 1346. His son and successor, Charles, was also emperor of Germany.

5. In the reign of Wenceslas VI king of Bohemia, and emperor, John Huss having read the books of Wickliffe the English reformer, introduced his doctrines into Bohemia. He was condemned to the flames in 1415. The Bohemians and Moravians have since become remarkable for various sects of religion, and consequent intestine commotions. The Hussites under Ziska, repeatedly defeated the troops of their king Sigismond, brother of Wenceslas, and also emperor of Germany.

6. Albert of Austria, having wedded the daughter of Sigismond, received the crowns of Bohemia and Hungary. But the succession was afterwards controverted and infringed by George Podiebrad, (a Hussite chief, who obtained from the weakness of the emperor Frederic III, of the house of Austria, the crown of Bohemia in 1459,) by Vladislas son of the Polish monarch, and by Mathias king of Hungary.

7. Louis, son of Vladislas, succeeded his father in the kingdoms of Bohemia and Hungary; but being slain at the battle of Mohatz, 1526, the crown finally passed to the house of Austria.

Of the provinces towards the Adriatic, the history is little memorable, except that of Venice, a recent acquisition. This ancient, and remarkable city was founded in the fifth century by the Veneti of the opposite shore, who fled from the incursions of the barbarians. At first each isle was governed by a tribune, till the year 697, when the first doge was elected. In the ninth and tenth centuries the government of the doges became nearly hereditary; but in the eleventh the election again became open. Towards the close of the twelfth century the democratic form was succeeded by an election, and administration, severely aristocratic, and well known by its singularity and stability. The Venetians having gradually extended their power along the Adriatic, in the year 1204, became masters of several Grecian provinces and islands; and after their contests with the Pisans, and Genoese, became the first commercial and maritime power in Europe, till the end of the fifteenth century, when the discovery of the Cape of Good Hope transferred the oriental traffic to the Portuguese, who were succeeded in maritime exertion by the Spaniards and Dutch, and lastly by the English, whose naval transcendancy exceeds all ancient or modern example. The authority of Venice declined with its commerce; and the republic may be said to have expired of mere old age.

Antiquities. The ancient monuments of the more northern kingdoms and provinces belonging to Austria, cannot be expected to be very numerous or important. Vindobona, and the adjacent parts of Noricum and Pannonia, occasionally display Roman remains; but the ruins of the celebrated bridge of Trajan, over the Danube, belong to Turkey in Europe, being situated not far from Widin, in Bulgaria: it is supposed to have consisted of twenty arches, or rather, vast piers of stone, originally supporting a wooden fabric of the length of more than 3,300 English feet. In Hungary, and other parts of the ancient province of Dacia, appear many relics of Roman power, as military roads, ruins, &c.; and an elegant historian remarks "that if we except Bohemia, Moravia, the northern skirts of Austria, and a part of Hungary between the Teyss and the Danube, all the other dominions of the house of Austria were situate within the limits of the Roman empire"*. Hungary, and the other provinces of the Austrian dominions, having been frequently exposed to the ravages of war, many ancient monuments have perished; yet several castles, churches, and

* Gibbon, vol. i. p. 22.

monasteries, still attest the magnificence of the founders*. The cathedral church of St. Stephen, in Vienna, is a Gothic fabric of singular pomp, and minute decoration. The antiquities of Venice, and of the north of Italy, and of Dalmatia have been repeatedly examined and described.

* Dr. Brown's Travels, part ii. p. 80.

CHAPTER II.

POLITICAL GEOGRAPHY.

RELIGION.—ECCLESIASTIC GEOGRAPHY.—GOVERNMENT.—LAWS.—POPULATION.—COLONIES.—ARMY.—NAVY.—REVENUES.—POLITICAL IMPORTANCE AND RELATIONS.

RELIGION. THE preponderant religion of the Austrian dominions is the Roman Catholic, but attended with a considerable degree of toleration. Protestants of various sects are found in Bohemia, and Moravia; nor are Lutherans unknown at Vienna, though they chiefly abound in Transylvania*; nay, in Hungary it is believed that the protestants are equal in number to the catholics†. Vienna did not become a metropolitan see till the year 1722: the archbishop is a prince of the holy Roman empire. The present state of the ecclesiastic geography, the number and boundaries of the bishopricks, &c. would require some investigation not interesting to the general reader.‡

GOVERNMENT. The form of government is an hereditary monarchy, and approaching to absolute power. For though Hungary retain its ancient states, or rather an aristocratical senate, yet the dominions being so various and extensive, and the military force wholly in the hands of the sovereign, no distinct kingdom or state can withstand his will: and except most oppressive measures were pursued, there can be no general interest to league against him. Even Austria has its states, consisting of four orders, clergy, peers, knights, burgesses; the assembly for Lower Austria being held at Vienna, and that of the Upper at Linz||. But those local constitutions can little avail against the will of a powerful monarch, supported by a numerous army.

LAWS. The laws vary according to the different provinces, almost every state having its peculiar code. The Hungarians in particular have vigorously defended their ancient laws, though in many instances illaudable, the peasantry being in a state of villanage till 1785**. Yet what is called the *Urbarium*, published by the empress Theresa in 1764, attempted with some success to define the rights of

* Busching, vi. 540. † Townson, 181.

‡ Hungary, the principal province, contains two archbishopricks and fifteen bishopricks, including Bosnia and Croatia. The archbishop of Gran has about 36,000*l.* a year, the others do not exceed 8000*l.*.....Townson, i. 137.

|| Busching, vi. 536, last French edition.

** Townson, 102. 107.

the landlords, and of the peasants, and was received for law. In 1786, Joseph II, after suppressing villanage in Bohemia and Moravia, extended the like freedom to Hungary: and this decree remains uncancelled, though many of the laws of that well-meaning but injudicious monarch expired with their author. Yet the boasted freedom of Hungary is rather that of a powerful aristocracy, than of the people at large. In general the laws may be regarded as mild and salutary; and the Austrians in particular are a well regulated and contented people; while the Hungarians are often dissatisfied, and retain much of their ancient animosity against the Germans. As Hungary is the most important province of the monarchy, it might perhaps have been more prudent to have there established the royal residence and seat of power, had not the repeated subjugation of a great part of that kingdom by the Turks, rendered such a design precarious.

POPULATION. The general population of the Austrian dominions is computed at more than 20,000,000; that of Hungary, Transylvania, and the Buckovina, being estimated at four millions and a half. Yet some authors compute the population of Hungary alone at 7,000,000; and a late German author has in consequence swelled the general population of the Austrian dominions to 25,000,000*. Hence, upon the whole, it will be reasonable to allow 23,000,000 as a medial computation of the numbers subject to the Austrian sceptre.

Of the other chief provinces, Bohemia is supposed to hold two millions and a half; and Moravia one million and a half. The whole acquisitions in Poland may contain more than three millions; the Italian dominions probably two; while the archduchy of Austria is computed at 1,685,000.

COLONIES. Till the acquisition of Venice, Austria might have been regarded as an inland power, the small harbour of Trieste being little known in commerce. Hence no foreign colonies have been planted by the Austrians.

ARMY. The army is computed by Boetticher at 365,455 men, in 136 regiments, of which forty-six are German, and only eleven Hungarian. This numerous army has been greatly diminished in the sanguinary contest with France; and perhaps, could not, at present, equal that of Prussia, computed at 200,000; and far less that of the great military power of Russia, doubling that number.

NAVY. An Austrian ship of the line would be regarded as a novelty on the ocean; but the acquisition of Venice will doubtless be followed by a navy.

REVENUE. The revenue is computed at more than 10,000,000*l.* sterling; to which Austria contributes about 3,000,000*l.*, and Hungary a little more than a million and a half. This revenue used to exceed the expenses; but the public debt now, probably, surpasses 40,000,000*l.* sterling, and the recent wars have occasioned great defalcations.

POLITICAL IMPORTANCE AND RELATIONS. Vast are the political importance and extent of the relations of the Austrian sovereignty. Setting aside the consideration of his influence, as emperor,

* See Townson, chap. v.

over the German states, the monarch may be regarded as an equal rival of France, and only inferior to the preponderance of Russia. Since the Austrian dominions and power have been swelled to their modern consequence, a determined rivalry has existed between them and France, which has, with reason, been jealous of the Austrian ambition. Alliances, even cemented by intermarriage, have not been able to overcome the opposition of interests; and England being also the rival of France, it has frequently become an unavoidable policy to maintain this dissention. There are also causes of confirmed jealousy between Austria and Prussia; and it is doubtful if even an invasion from Russia would compel them to unite in a defensive alliance. The inveterate wars with Turkey, and the radical difference of religion and manners, more impressive from vicinity, have also sown irreconcilable hatred between the Austrians and Turks; and the ambition of Austria eagerly conspires with Russia against European Turkey. Amidst so many enmities, and the necessary jealousy of Russian power, it would be difficult to point out any states on the continent, with which Austria could enter into a strict and lasting alliance. The most natural and constant may be that with England, whose maritime power might inflict deep wounds upon any enemy; but against Russia an alliance with Prussia would be indispensable*.

* Since this chapter was at the press, an important work has come to hand, entituled *Aperçu Statistique des Etats de l'Allemagne; sous le rapport de leur Etendue, de leur Population, de leurs Productions, de leur Industrie, de leur Commerce, et de leurs Finances; par Hoeck, Conseiller de Justice du Roi de Prusse, &c.* Paris, An. ix. (1801,) large folio. This work is certainly the most complete view, which has appeared, of the numerous and important German states. But it is a great defect that there is no general sum of the entire population, &c. &c. of each sovereignty.

Bohemia is estimated at 2,806,493: Moravia 1,256,240: duchy of Austrian Silesia 250,000: Austria 1,820,000: Stiria, &c. 1,645,000: Tirol 610,000: Hungary 6,315,000: Illyria 1,035,000: Transylvania 1,443,364: Galitz, &c. 2,797,119: Bukovin 130,000. That is, in all, little more than twenty millions, exclusive of Venice, &c.

In like manner the Commerce, Army, Square Miles, Finances, are only particularized under each subdivision, without general estimates, a plan which leads to perplexity and additional labour, though the work be highly valuable in other respects.

CHAPTER III.

CIVIL GEOGRAPHY.

MANNERS AND CUSTOMS.—LANGUAGE.—LITERATURE.—EDUCATION.—UNIVERSITIES.—CITIES AND TOWNS.—EDIFICES.—ROADS.—INLAND NAVIGATION.—MANUFACTURES AND COMMERCE.

MANNERS AND CUSTOMS. VARIOUS are the manners and customs of the numerous kingdoms and provinces subject to the house of Austria. Vienna, the capital, presents, as it were, an assemblage of nations, in their various dresses. In Austria proper, the people are much at their ease: and the farmers, and even peasantry, little inferior to those of England. Travellers have remarked the abundance of provisions at Vienna, and the consequent daily luxury of food, accompanied with great variety of wines. The Austrian manners are cold, but civil; the women elegant, but devoid of mental accomplishments, the only books they read being holy legends*. The use of rouge is universal, but moderate; and the dress is singularly splendid. They retain the absurd fashion, universal on the continent, of dressing little girls like women, with the high powdered head, and the hoop. The manners somewhat partake of the Italian and Spanish cicisbeism, forming in this respect a kind of medium between the profligacy of the south of Europe and the decency of the north. The Austrian youth of rank are commonly ignorant, and of course haughty, being entire strangers to the cultivation of mind, and condescension of manners, to be found among the superior ranks of some other countries, a circumstance more striking to the English traveller in particular, from the violence of the contrast. An Austrian nobleman or gentleman is never seen to read, and hence polite literature is almost unknown and uncultivated; nor have the Austrians yet claimed any share in its progress in Germany. Yet the emperor having long been considered as the highest power in Europe, the Austrians affect to consider themselves as superior to other nations. It is to be regretted that a more rational mode of education is not followed, which would open their minds to the numerous delights and advantages arising from scientific pursuits, and deliver them from many vain superstitions, as they believe in ghosts and familiar spirits, and in the idle dreams of alchymy. In consequence of this ignorance the language remains unpolished; and the Austrian speech is one of the meanest dialects of the German,

* Wraxall's Memoirs, ii. 240, &c.

so that polite people are constrained to use French. The lower orders are, however, little addicted to crimes or vices, and punishments are rare: robberies are seldom committed, and murder little known. When capital punishment becomes unavoidable, it is administered with great solemnity, and accompanied with public prayers, an example worthy of universal imitation.

The next people in estimation, and the first in numbers, are the Hungarians. Their manners are now considerably tinctured by those of the ruling Germans, but they remain a spirited people, and affect to despise their masters. Their dress is well known to be peculiar, and is copied by our hussars*. This dress, consisting of a tight vest, mantle, and furred cap, is graceful; and the whiskers add a military ferocity to the appearance. In other respects, recent travellers do not seem to have been impressed with much distinction between the Austrian and Hungarian manners. The change introduced into those of Venice by the Austrian domination has not yet been described. The Morlacs, and other inland tribes of Dalmatia, are honest and sincere barbarians; and the dress of their Vaivods somewhat resembles the Hungarian. Dalmatia being divided between the Greek and Catholic religions, they have grafted many superstitions upon both: but for a full account of their manners and customs, the curious reader must be referred to Fortis's travels in Dalmatia†.

LANGUAGE. The languages spoken in these aggregated dominions are numerous and discrepant. They belong chiefly to three grand divisions, the Gothic or German of the ruling nation, which will gradually exclude the others: the Slavonic of the Poles‡, part of the Hungarians, the Dalmatians, &c., and also the ancient speech used in Bohemia and Moravia: and lastly the Hungarian proper, which has been considered as a branch of the Finnic. The Italian of course prevails in the states of Italy that are subject to Austria: and the Tyrolese, &c. use a mixture of Italian and German. Among people of rank at Vienna the French was formerly prevalent, as already mentioned; but this fashion is perhaps impaired by recent events, and the use of the polished German of Saxony would not only be more appropriate, but might tend to diffuse a national taste and native literature. Reisbeck observes that in Swabia, Bavaria, and Austria, the German is very impure.

LITERATURE. Exclusive of the Italian provinces, the literary history of the Austrian dominions cannot ascend to a remote period. That of Austria proper, in particular, is little interesting, and even the chronicles and lives of the saints are comparatively recent. If the emperor Maximilian, grandfather of Charles V, be the author of an eccentric poem alluding to the events of his own life, and usually ascribed to him, though many assign it to his chaplain, he may be considered as the father of Austrian literature, as well as of Austrian

* In the Hungarian, *Huszar* implies the twentieth, because twenty peasants are obliged to furnish one horseman to the cavalry. Busch iii. 56.

† P. 43—88.

‡ Nor is it disused in Bohemia, which may be regarded as the extreme western limit of the Slavonic *tongue*, for the *people* extend to the mouth of the Elbe.

greatness. But the succession of authors is interrupted; and many of those who flourished at Vienna were aliens. Wolfgangus Lazius is but a dreaming antiquary: and in the same century Cuspinian has ridiculed Haselbach, the professor of divinity, who, having begun a course of lectures on Isaiah, had not in twenty-one years finished the first chapter. The like perversity of taste continues to modern times; and Riesbeck has depicted in warm colours the metaphysical absurdities of the Austrian professors, and the abject tone of slavery and flattery which pervades even the little solid literature that is known*. For at Vienna the emperor is considered as the successor of Augustus, as absolute monarch of Germany; while in the other provinces of that wide region, he is more justly regarded as a nominal head, though highly respectable as king of Hungary and Bohemia. In the medical branch, Van Swieten, Storck, and others, have acquired deserved celebrity: but though Vienna swarm with pretended literati, or men who can talk and write nonsense in Latin, there are a few who have acquired a shadow of reputation, such as Hell, Martini, Denis and Sonnerfels; yet the first was a Silesian, and Denis from Bavaria. In antiquities occur the names of Froelich, and one or two other numismatic writers, who compose vast volumes upon small subjects.

Bohemia and Hungary have no ancient claims to literature. Cosmas of Prague, a venerable historian, flourished about the year 1130; and Hungary has a cotemporary father of history in the anonymous notary of king Bela†. Yet the encouragement given to writers by the celebrated Mathias Corvinus little stimulated native literature, for Bonfinius was an Italian. Nor is there any Hungarian writer particularly celebrated among the modern Latin classics; nor the native language yet known by any work commanding celebrity. Baron du Born, a native of Transylvania, has written many able works on natural history; but he used the Latin and French languages. An inquiry into the causes which have retarded the progress of letters and philosophy in the Austrian dominions, would be more useful than the bare enumeration of a few names: they would be found to arise partly from the coarseness of the German dialect, and the absence of the Slavonic and Hungarian from the learned languages of Europe; partly from numerous wars of ambition, which sometimes endanger the very existence of the state; in yet greater measure from the military education of the nobility, or rather indeed from their ignorance, for many consummate officers have been men of letters: but above all, this defect must be ascribed to that metaphysical bigotry, which perverts their rational powers, and blights every bud of genius and solid knowledge. The books prohibited at Vienna probably exceed in number those of the Index Expurgatorius; and though the government have no doubt a right to watch over those of a political tendency, yet this jealousy needs not be extended to works of mere science, written by heretics. On the other hand, some blame must doubtless extend to authors who introduce into scientific productions their political dogmata, and visionary views of social perfection, with attacks upon established forms of wor-

* Travels, vol. i. 283.

† Katona, Hist. Crit. Hung. Proleg.

ship and government, totally unlike the procedure of the ancient philosophers, who were teachers of content and moderation. Yet a government should select the happy mean between that fanatic bigotry, which alike freezes literature and every branch of industry; and that licentiousness of the press, which, by wantonly sapping personal reputation, and the laws, tends to destroy every habit of virtue, and can only lead to anarchy.

EDUCATION. The empress Theresa instituted schools for the education of children, but none for the education of teachers. Hence the children are taught metaphysics before they know Latin; and a blind veneration for the monks, forms one of the first exertions of nascent reason. Yet the example is highly laudable, and with all its disadvantages may lead to important consequences.

UNIVERSITIES. The universities, like those in other catholic countries, little promote the progress of solid knowledge. The sciences taught with the greatest care are precisely those which are of the smallest utility. The university of Vienna has, since the year 1752, been somewhat improved. It was founded in 1237, and that of Prague in 1347; that of Inspruck only dates from 1677, and Gratz from 1585*. Hungary chiefly boasts of Buda, though the Jesuits instituted academies at Raab and Caschau.† A late traveller‡ informs us that the university of Buda, by the Germans called Offen, possesses an income of about 20,000*l.* sterling, only 4,000 of which are applied to pay the salaries of the professors. "Besides the usual chairs which exist in every university, there are those of natural history, botany, and economy. The collection of instruments for natural philosophy, and the models of machines, are good; and the museum of natural history, which contains the collection of the late professor Piller, besides that of the university, may be ranked among the fine collections of Europe." There is a Calvinist college or university at Debretzin: and the bishop of Erlau has recently established a splendid university at that city‖.

CITIES AND TOWNS. Vienna, the chief city of the Austrian dominions, lies on the south, or rather west side of the Danube, in a fertile plain watered by a branch of that river, (beyond which stands the suburb of Leopold-stadt,) and by the little river Wien. The Danube is here very wide, and contains several woody isles: the country towards the north and east, level, but on the south and west, hilly, and variegated with trees. It is founded on the site of the ancient Vindobona; but was of little note till the twelfth century, when it became the residence of the dukes of Austria, and was fortified in the manner of that age. The manufactures are little remarkable, though some inland commerce be transacted on the noble stream of the Danube. The number of inhabitants is computed at 254,000. The suburbs are far more extensive than the city, standing at a considerable distance from the walls. The houses are generally of brick covered with stucco, in a more durable manner than commonly practised in England; the

* Dufresnoy, Methode Geog. iii. 271.

† The university of Tyrnau has been recently transferred to Pesth Townson, p. 439. ‡ Ibid. p. 79. ‖ Ibid. 238, 225.

finest sand being chosen, and the lime, after having been slacked, remaining for a twelvemonth, covered with sand and boards, before it be applied to the intended use. The chief edifices are the metropolitan church of St. Stephen, the imperial palace, library, and arsenal, the house of assembly for the states of Lower Austria, the council-house, the university, and some monasteries. The prater, or imperial park, is an island in the Danube well planted with wood; and to the south is the chapel of Herenhartz, which during Lent, is much frequented for the sake of amusement, as well as of devotion. Provisions of all kinds abound in Vienna, particularly wild boars, venison, and game; many small birds rejected by us being included among the latter. Livers of geese are esteemed a peculiar delicacy; nor are tortoises, frogs, and snails rejected*. The people delight in the combats of wild beasts, and of bulls. In one of the suburbs is the palace of Belvidere, which formerly belonged to prince Eugene; and at the distance of a few miles stands Schonbrun, another imperial palace. Though Vienna be much exposed to the northern and eastern winds, yet the southern hills serve as a fence against the rain, and the traveller rather complains of dust than of moisture. The pleasantness of the environs in general is improved by the happy aspect of the Austrian peasantry.

Milan. Next in importance to Vienna was Milan, the inhabitants of which were computed at more than 130,000. The loss of Milan would be richly recompensed by the acquisition of Venice, supposed to contain 200,000 souls. The latter celebrated city, singularly situated in the lagunes, or shallows of the Adriatic sea, and secured in a great measure from the fury of the waves by exterior shoals, which form a natural fortification on that side, has been so frequently described, that except new circumstances could be added concerning the Austrian administration, it would be superfluous to enter into any antiquated details.

Prague. The honour of the third city in the Austrian dominions must be claimed, by Prague, the population being estimated at 80,000. This metropolis of Bohemia stands on both sides of the river Mulda, over which there is a noble bridge of stone, founded in 1357. The fortifications are of small moment; but the houses are of stone, and commonly three stories in height. This city has had the fatality of being exposed to frequent sieges, commonly fortunate to the aggressors. About a sixth part of the population consists of Jews.

Gratz. Next, though at a great distance, stands Gratz, the capital of Stiria, supposed to hold 35,000 souls. This city stands on the west side of the river Muehr, joined by a bridge to an extensive suburb on the opposite bank. There are regular fortifications: and on a bold rock near the river is placed a strong citadel.

Presburg. Presburg, the capital of Hungary, only contains about 27,000 inhabitants, its precedence being of modern date, after Buda

* Riesbeck, himself a German, blames the Austrians, i. 237, for gluttony, and a certain indescribable coarse pride. Yet he highly praises the schools, p. 280. The richest subject by his account was Prince Lichtenstein, who had about 90,000*l.* sterling a year, while Esterhazy only enjoyed 60,000*l.*

the ancient capital had been repeatedly taken by the Turks*. Presburg is beautifully situated on the Danube, towards the western extremity of Hungary, being only about thirty-five British miles to the east of Vienna: but the position is still more uncentrical than that of Buda. The Danube is here very rapid, and about two hundred and fifty yards in breadth. About one quarter of the inhabitants are Lutherans, who are so opulent as to pay about one half the taxes. A good theatre, and convenient coffee-houses contribute to the pleasure of the inhabitants. Jews also abound in the city.

BUDA, OR OFFEN. Buda, by the Germans called Offen, the ancient metropolis of Hungary, is now reduced to little more than 20,000 inhabitants; but if the city of Pesth be included, which stands on the opposite side of the Danube, over which there is a bridge of boats, the population may be computed at 34,000. Dr. Townson even allows 38,000. The chief public and private buildings are in Pesth, and within the fortress: the royal palace in particular is a large and stately edifice. At Buda there are hot springs; and the people, like those of Vienna, delight in bull feasts and exhibitions of wild beasts. In 1784 the seat of the provincial government, and the public offices being restored from Presburg to Buda, the latter joined with Pesth, may still be regarded as the capital of Hungary†. The mining cities of Schemnitz and Cremnitz do not exceed 8000 inhabitants each‡.

HERMANSTADT. Hermanstadt, the capital of Transylvania, in Latin *Cibinium*, from the river Cibin, is supposed to contain 17,000. It is the chief seat of the Saxon colony; but the air is unhealthy. The Buckovina, annexed to the Austrian territory in 1777, contains no town of consequence.

That part of Poland which was acquired in 1772, and divided into two provinces, called Galitzia and Lodomiria, presents Lemberg, or Leopold, of 20,000 inhabitants, and some other considerable towns.

CRACOW. Among the Polish acquisitions must also be named Cracow, anciently the capital of that kingdom, and estimated to contain 24,000 people. This city stands on the Vistula, and has a castle, but is poorly fortified.

Brunn, in Moravia, is computed at 18,000; and Olmutz, in the same country, at 12,000; and the latter number is also assigned to Troppau, in the Austrian part of Silesia. In the southern provinces, Inspruck and Trent are supposed each to contain 10,000 souls.

TRIESTE. Trieste, which is reckoned at 18,000, deserves more particular attention, having been for a long time the only sea-port belonging to Austria. It is situated on a gulf of the Adriatic, and rises on an ascent which is crowned by a castle. The shipping is secured by a wall, extending from the Lazaretto to the isle of Zuka; and the har-

* Townson, 440. *Alba Regalis*, formerly celebrated, is now Stuel Weissenburg, thirty-four British miles south-west of Buda. *Alba Græca*, or Griechs Weissenburg, is Belgrade.

† Townson, p. 90. ‡ Hoeck puts Cremnitz at 4000.

bour was declared free by the empress Theresa. The neighbourhood produces excellent wines.

Some towns in the Austrian part of Italy, and in Dalmatia, might here deserve notice, were there not uncertainties concerning the duration of the subjection to Austria.

EDIFICES. The chief public edifices are at Vienna, Buda, and Pesth, to which may now be added Venice; but there are many splendid churches and monasteries in the several regions of the Austrian domination. Many of the Hungarian nobility, who have vast estates, possess castles of corresponding magnificence. Among these, the chief are the Palesy, Schaki, Erdoby, Sichy, Forgatsh, Kohari, Karoly; but above all Esterhazy, whose castle, about a day's journey from Presburg, is said to rival Versailles in pomp; and seems also to rival that palace in the surrounding desolation, being in a morassy country near the Neusidler lake.*

INLAND NAVIGATION. The utility of inland navigation seems to be little perceived in the Austrian dominions; and even the noble canals in the Austrian Flanders have suffered by strange neglect. The long navigable course of the Danube may, in some measure, apologize for this deficiency; but there is no doubt that the greatest advantages might be derived by opening canals in some of the provinces, particularly towards the Adriatic, and in Hungary.

MANUFACTURES AND COMMERCE. Nor do manufactures seem to be cultivated to a great extent in any part of the Austrian dominions. Vienna perhaps equals any other of the cities in manufactures, which are chiefly of silk, gold, and silver lace, cloths, stuffs, stockings, linen, mirrors, porcelain; with silver plate, and several articles in brass†. Bohemia is celebrated for beautiful glass and paper. But the commerce of the Austrian dominions chiefly depends upon their native opulence; Austria proper and the southern provinces producing abundance of horses and cattle, corn, flax, saffron, and various wines, with several metals, particularly quicksilver from the mines of Idria. Bohemia and Moravia are also rich in oxen and sheep, corn, flax, and hemp; in which they are rivalled by the dismembered provinces of Poland. The wide and marshy plains of Hungary often present excellent pasturage for numerous herds of cattle; and the more favoured parts of that country produce corn, rice, the rich wines of Tokay, and tobacco of an excellent flavour, with great and celebrated mines of various metals and minerals. The Austrian territories in general are so abundant in the various necessaries and luxuries of life, to be found either in the north or south of Europe, that the imports would seem to be few and inconsiderable. Till the acquisition of Venice, the chief exports were from the port of Trieste, consisting of quicksilver and other metals, with wines and other native products. The commerce of Venice had sunk in great decline, but its subjection to Austria may perhaps infuse a new spirit of exertion: the remaining trade of that city chiefly consisted in scarlet cloth, and in stuffs, inwoven in gold and silver, sold to much advantage in the Levant; and the Venetian mirrors retain their ancient reputation; but the city did not

* Riesbeck, ii. 49, 66. † Busching, vi. 549. See Hoeck.

exist so much by immediate commerce, as by the vast wealth acquired during a long period of prosperity. Dr. Townson* gives a table of the exports of Hungary for one year, from which it appears that they consisted chiefly of cattle, hogs, sheep, flour, wheat, rye, wool, and wine, carried to other Austrian provinces; and only about one seventh part sent to foreign countries.

* p. 198. Hoeck says, that in the archduchy of Austria there are seven great manufactures of cotton cloth, which occupy 140,000 individuals; and at Lintz a woolen manufactory employs 30,000. The iron manufactures are numerous in Stiria. Bohemia has linen manufactures to the annual amount of 16,000,000 of florins, with some in wool, and cotton. For the others, that author may be consulted.

CHAPTER IV.

NATURAL GEOGRAPHY.

CLIMATE AND SEASONS.—FACE OF THE COUNTRY.—SOIL AND AGRICULTURE.—RIVERS.—LAKES.—MOUNTAINS.—FORESTS.—BOTANY.—ZOOLOGY.—MINERALOGY.—MINERAL WATERS.—NATURAL CURIOSITIES.

CLIMATE AND SEASONS. THE climate of Austria proper is commonly mild and salubrious, though sometimes exposed to violent winds, and the southern provinces in general enjoy delightful temperature, if the mountainous parts be excepted, exposed to the severities of Alpine winter. The more northern regions of Bohemia and Moravia, with the late acquisitions in Poland, can likewise boast the maturity of the grape, and of gentle and favourable weather. The numerous lakes and morasses of Hungary, and the prodigious plains resembling deserts, are supposed to render the air damp and unwholesome, the cold of the night rivalling the heat of the day; but the keen blasts from the Carpathian mountains seem in some measure to remedy these evils, the inhabitants being rather remarkable for health and vigour.

FACE OF THE COUNTRY. The appearance of the various regions subject to Austria is rather mountainous than level, presenting a striking contrast in this respect to those of Russia and Prussia. Commencing at Bregentz on the lake of Constance, we find chains of mountains, and the Rhætian Alps, and glaciers of Tyrol, branching out on the south and north of Carinthia and Carniola. Another chain pervades Dalmatia, and on ascending towards the north, Stiria displays chains of considerable elevation. The southern limit of Austria proper is marked by other heights; and Bohemia and Moravia are almost encircled by various mountains, which on the east join the vast Carpathian chain, which winds along the north and east of Hungary and Transylvania, divided from each other by another elevated ridge: the dismembered provinces of Poland, though they partake in the south, of the Carpathian heights, yet must afford the widest plains to be found within the limits of Austrian power.

This ample extent of country is also diversified by many noble rivers, particularly the majestic Danube, and its tributary stream the Tiess, which flows through the centre of Hungary; and scarcely is there a district which is not duly irrigated. The general face of the Austrian dominions may therefore be pronounced to be highly variegated and interesting; and the vegetable products both of the north and south of Europe unite to please the eye of the traveller.

Soil and Agriculture. The soil is upon the whole extremely fertile and productive, in spite of the neglect of industry, which has permitted many parts of Hungary, and of the Polish provinces, to pass into wide forests and marshes. Were skill and labour to assume the axe and spade, those very parts might display the greatest exuberance of fertility. Travellers seldom attend to the important topic of national agriculture; and therefore intelligence somewhat antiquated must be adopted. About the year 1770, Mr. Marshall* found that Bohemia had suffered considerably by the ravages of war; the wheat was however tolerable, but the barley full of weeds, and exposed by negligence to the inroads of the cattle, who are fed in winter with the cabbage-turnip, and red cabbage, both cultivated in large quantities. The flax seemed particularly to flourish; but the industry of the citizens, farmers, and peasants, was crushed by the overweening pride of the nobility, and the state of the peasantry was little superior to that of Poland. In the warm spots of Bohemia hops were cultivated, which with the barley formed excellent beer, a chief export of the country. In Moravia the agriculture seemed rather superior, being improved by Flemish farmers. That of Austria was laudable, except that enclosures were wanting. The greater part of Hungary he regarded as a fertile pasturage for sheep; and Flemish manufacturers were employed to improve the wool. Oats were little cultivated in Austria proper; the other products, as usual in England, particularly abundance of cabbages and potatos; but the cultivation was not neat, small waste spots being left by the plough, which harboured weeds, to the great detriment of the field. The vineyards and fields of saffron were numerous, cattle appeared in abundance; and large herds of swine, the latter feeding all the summer in the woods. At a more recent period, Mr. Coxe† gives a deplorable picture of the want of cultivation in the southern provinces of Poland, now subject to Austria, the country being generally overspread with vast tracts of thick gloomy forests, and even from Cracow to Warsaw, a course of about two hundred and fifty-eight English miles, he only met with two carriages, and about a dozen carts. The country was generally sandy or marshy, and quite devoid of marks of industry: the peasantry were the most miserable and abject that he had ever seen, and would assemble in crowds to implore charity. Such being the case, Austria cannot have made any great acquisition in her Polish provinces; and Prussia has in fact the chief reason to boast of the partition.

Rivers. In enumerating the chief rivers which pervade the Austrian dominions, the Danube commands the first attention. This magnificent stream rises in Swabia; and Count Marsigli has delineated and explained its humble fountains, in his large and curious work on this river. Though the course be occasionally impeded by small falls and whirlpools, yet it is navigable through a prodigious extent, and after watering Swabia, Bavaria, Austria proper, Hungary, and Turkey in Europe, it joins the Euxine, or Black Sea, after a comparative circuit of about 1300 British miles, about one half of its progress being through the territories of Austria.

* Travels, iii. 304. † Vol. i. 162, and p. 202.

TIESS. Next in consequence is the Tiess, which arising from the Carpathian mountains, towards Buckovina, and bending towards the west, receives many tributary streams from that Alpine chain; and afterwards turning to the south falls into the Danube not far to the west of Belgrade, after a course of about 420 miles. At Belgrade the Danube receives the Sau, or Save, which forms a boundary between Austria and Turkey, rising not far from Idria in the mountains of Carniola, and pursuing a course nearly equal in length to that of the Tiess. That of the Drau or Drave extends to about 350 miles, from its source in the eastern mountains of Tyrol, till it join the Danube below Esseg.

INN. The Inn rises in the east of Swisserland, from the mountain of Maloggia in the Grisons, being a point of partition dividing the waters which run towards the Black Sea, from those which flow into the Adriatic*. This powerful river is more gentle near its source, than the other Alpine streams, but soon becomes more precipitous; and joins the Danube at Passau with a weight of water nearly equal to that stream, after a course of about 250 miles, being nearly equal to that of the Danube itself at their junction.

The Raab, and the Leytha, intermediate streams between the Drave and the Inn, only deserve a brief mention.

MULDA. The Mulda is a considerable river which rises in the southern mountains of Bohemia, and after running about fifty miles south-east, bends due north, and joins the Elbe near Melnick, after passing through Prague.

ELBE. The Elbe itself arises in the Sudetic mountains between Bohemia and Silesia, and waters a great part of the former kingdom before it enters Saxony, bending its course north-west towards the German ocean.

MORAU. The Morau, whence Moravia derives its name, also arises in the Sudetic mountains; and passing by Olmutz joins the Danube not far to the west of Presburg.

ADIGE. Of the more southern streams, the Adige springs from the Rhætian Alps, and being joined by the Eisac on the east, pervades the south of Tyrol, and Trent, then flows by Verona towards the Adriatic, which it joins only about ten miles to the north of the Po. The Tagliamento, Piave, and Brenta, all springing from the Tyrolese Alps, may also be now regarded as Austrian streams.

LAKES. The lakes in the Austrian dominions are numerous, and some of them of considerable size. Bohemia presents a few small pieces of water, towards its southern boundary; but on entering Austria proper, the lake of Traun, the Ebernsee, and others, are of greater extent. Carinthia contains a large central lake not far from Clagenfurt; and Carniola another, the Cirknitz See. Tyrol, though an Alpine country, displays no lake of any consequence, except a part of the Lago di Garda; but the glaciers are numerous. Hungary contains many morasses, and lakes; the most important of the latter being that of Platte, or the Platten See extending about forty-five British miles in length, by eight in breadth, and abounding with fish. The Neusidler lake, about

* Coxe's Swiss. iii. 38.

thirty miles south-east of Vienna, is about thirteen miles in length by four in breadth. It is almost surrounded by fens; and is chiefly remarkable for being in the vicinity of Eisenstadt, the princely residence of the family of Esterhazy. On the east of the Tiess is the lake of Palitzer, about eight miles in length. In Transylvania is the Tsege To; and many small lakes are situated amidst the Carpathian mountains.

MOUNTAINS. In considering the various elevated chains which diversify the Austrian territories, the description shall begin with the western extremities, and terminate with the eastern.

RHÆTIAN ALPS. In this point of view the Rhætian or Tyrolese Alps will claim the first attention. These chiefly proceed in a direction from the south-west to the north-east, or from the Valteline to the archbishoprick of Salzburg. This, Saussure has observed, is the general course of the Alpine chains*. The Brenner mountains, for such is the modern name of the Rhætian Alps, rival the Grand Alps of Switzerland in numerous glaciers; and like other grand chains present exterior barriers, that on the north being distinguished by the name of Spitz, while that on the south is termed Vedretta†. On leaving Italy, there is almost a gradual ascent, from Trent to the highest summit. The primitive or greatest elevations arise to the north of Sterzing, whence streams proceed towards the river Inn on the north, and the Adige on the south, and the Eisac descends, a precipitous torrent, amidst masses of granite, petrosilex, and marble, while the avalanches become dangerous to travellers. "The naked and rugged peaks of the mounts Lorenzen, Fartschel, and Tschafatfeh, raise their towering heads towards the north-west, and on the south-east are those of Glander, Schloss, Pragls, and Pallanser. Their summits are entirely bare; and seem to be composed of granite." The glacier most easy of access is that of Stuben, the centre of which presents many Alpine plants, and the granite and porphyry are frequently covered with calcareous stone. The glacier of Stuben is 4692 feet above the level of the sea, and presents the usual phenomena of such scenes, with beautiful pyramids of azure, which in sunshine reflect a blaze of light. The mountain specially called Brenner is, according to Beaumont, only 5109 feet above the sea. The town of Steinach is placed nearly in the centre of the Tyrolese chain: towards the east, from the midst of a long course of glaciers running north-east and south-west, rises the grand mountain Gefrorn, a mass of granite covered with eternal snow, and one of the highest peaks of the Rhætian Alps: on the west is Habichspiz, of smaller height; but to the south-west is Tributaan, another stupendous peak of the great Brenner chain. The Bock-kogo is another vast peak, rising little inferior to Gefrorn, and in the same latitude, but towards the west‡.

* Vol. viii. 241.

† Beaumont's Rhæt. Alps, London, 1792, fol. p 37, &c.

‡ Beaumont's Rhæt. Alps, 59. The Brenner, or burning hill, is so called on account of the frequent thunder storms. Ibid. 65. The Glockner and Ortel are computed at 11,500 feet. In the archbishoprick of Salzburg the Hoch-horn at 10,663. Monthly Mag. ix. 539.

Towards the west and north of Inspruck are several detached mountains, covered with constant snow; among which those of Verner* are the most remarkable. Near the glaciers are found rock crystals of various colours, vulgarly called rubies, emeralds, &c. and the inferior ranges of the Tyrolese mountains contain mines of silver, copper, lead, mercury, iron, alum, and sulphur. In the vale of Zill, is a mine of gold, which barely defrays the expense and labour. Towards the south, the mountains are rich in wood and pasturage; but the northern hills are bleak and barren. The inferior mountains are, as usual, calcareous, or argillaceous; but those of Verner are granitic. The Tyrolese Alps being seldom visited by travellers, it was judged proper to give rather an ample description.

ITALIAN. In the provinces towards the south and east of Tyrol, the mountains are not of such considerable elevation; yet the northern parts of the territory, formerly Venetian, present many considerable hills, branching from the Swiss and Tyrolese Alps. A minute enumeration would be superfluous; but Mount Baldo on the east of the lake Garda, must not be omitted, having become remarkable among botanists by a variety of curious plants. Mount Bolca, fifty miles north-west of Venice, is noted for fossil fish in argillaceous schistus. The Euganean hills, near Padua, have been supposed to be volcanic.

CARNIC. But leaving the uncertain possessions in Italy, the provinces of Carinthia and Carniola present many considerable chains of mountains; as that of Lobel which separates these countries; and the Julian, or Carnic Alps, (now called Birnbaumer Wald,) which divide Carinthia from Italy. Carniola is chiefly mountainous, and many of the summits are covered with lasting snow; the most memorable are the Kalenberg near the river Save, and the Runberg, and the Karst to the south of Idria. Here also terminates the vast chain, which proceeds by the north of Dalmatia towards the Hæmus, and is known by many local appellations, as Mount Promina near Gnin, Mount Prologh, Mount Clobu, &c. &c. but better distinguished by the title of the Dalmatian chain. The latter mountains are chiefly calcareous†.

Returning towards the north, first occurs the chain of Bacher, in the south of Stiria; mount Grasan on the east of Judenburg; and the chief mountains in this province, those of Grimin, in its western extremity towards Salzburg. On the east towards Hungary this country is more plain and fertile.

AUSTRIAN. On the south of Austria is a chain of inconsiderable elevation. Busching supposes that the ancient Cetius is a ridge extending from near the source of the river Save, towards the Danube, about nine British miles on the west of Vienna, where it is called Leopoldsberg‡. The general name is the Kalenberg; but parts of it go under particular denominations, as Caumberg, Annaberg, Saurussel, Teufelstaig, Golach, Schneeberg, Semmering, &c. and it is certain

* Busching, vii, 84, says *Ferner* is merely a Tyrolese term for a glacier.

† Fortis's Dalmatia.

‡ vi. 527-8. The ridge of Kalenberg was the western boundary of Germany till about A. D. 1040, when it was removed east to the river Leitha. Putter, i. 155.

that the Cetian chain of Ptolemy runs in that direction*. However this be, Upper Austria, or the western part of this province, contains many considerable mountains, the highest of which is in the maps called Priel, but the proper name is Gressenberg. Towards the north Austria is divided from Bohemia by a ridge of considerable elevation, which passes to the north-east of Bavaria. On the north-west Bohemia is parted from Saxony by a chain of metallic mountains, called the Erzgeberg, a word that implies hills containing mines. On the west of the river Eger, near its junction with the Elbe, stands the mountainous groupe of Milessou supposed to be the highest in the province†. On the north-east the Sudetic chain, which branches from the Carpathian, divides Bohemia and Moravia from Silesia and the Prussian dominions.

CARPATHIAN MOUNTAINS. The Carpathian mountains, that grand and extensive chain which bounds Hungary on the north and east, have been celebrated from all antiquity. By the Germans they are styled the mountains of Krapak, probably the original name, which was softened by the Roman enunciation: the Hungarians, a modern people, called them Tatra. This enormous ridge extends in a semicircular form from the mountain of Javornik south of Silesia towards the north-west. But at the mountain of Trojaska, the most northern summit, it bends to the south-east, to the confines of the Buckovina, where it sends forth two branches, one to the east, another to the west of Transylvania: which is also divided from Walachia by a branch running south-west and north-east. The whole circuit may be about 500 miles. Dr. Townson visited these Hungarian Alps from the vicinity of Kesmark, first proceeding to the Green See, a lake amidst the mountains, passing through forests of firs, which were succeeded by rocks of limestone and granite. The Krumholz, a kind of tree resembling the pine, but feathered with thick branches to the very ground, somewhat impeded the progress. He computes that the Kesmark peak, which towards Hungary is a perpendicular rock, may be about 8508 feet above the level of the sea. He afterwards proceeded to the Lomnitz peak, which he says is the highest of the whole Carpathian chain, and placed towards its centre: yet he afterwards expresses some doubt whether it be not rivalled, if not exceeded by the Krivan, situated more towards the west, 20° 45′ of east longitude from London‡. The summit of Lomnitz he attained with some difficulty, and computed it to be about 8640 feet above the level of the sea, not much above half the height of M. Blanc, or M. Rosa. He found it composed of grey granite like the rocks at the bottom; but with a small mixture of a greenish black, earthy substance; yet the vegetation consisted of little except a few lichens. Those peaks are seldom visited except by the hunters of the chamois, and some idle

* The Semmering heights divide Austria from Stiria; and a noble road was formed over them in 1728. The Lobel, between Carinthia and Carniola, is passed by a singular excavation through a summit. Brown, 125.

† Busching, vi. 126. The Donnerberg, near Milessou, is regarded as the highest mountain in Bohemia. The summit of the Riesengeberg is free from snow in summer, and probably not above 6000 feet high. See Riesbeck, ii. 149.

‡ Townson, 358. 363.

adventurers, who search for gold and precious stones. The marmot also appeared; but our intelligent author denies that the ibex, or rock goat of the Swiss Alps, is found in the Carpathian heights. The Krivan he afterwards ascended with more ease, but found it inferior in height to the Lomnitz, being 8343 feet above the sea. It is probable that summits of greater elevation arise in the eastern part of the chain; but there are no glaciers, nor other tokens of the eternal winter, of great altitude.

The Carpathian ridge occasionally branches towards the north and south; in the former direction the most remarkable are, the hills on the west of Silesia, those which adjoin to the salt mines of Wieliczka, a few miles south-east from Cracow, in Poland, and those which extend through part of the Buckovina. Towards the south a branch stretches from the centre of the chain towards Tokay; and there are other branches not accurately defined, which descend in the same direction from the eastern circuit. Among the detached mountains of Hungary may be named those of Matra, in the centre of the kingdom, about fifty miles north-east of Buda: those of Fatra north-east of Cremnitz: of Avas in the district of Marmaruss: Farkas to the south of Nemethi. The mountains of Transylvania are numerous, besides the two branches of the Carpathian chain, which may be regarded as enclosing the country. The Bannat of Temeswar also presents many ridges of considerable height.

Forests. To enumerate the forests in the Austrian dominions, would be a task at once laborious and fruitless. Suffice it to observe that numerous and extensive forests rise in every direction, particularly along the Carpathian mountains, and in the provinces acquired from Poland. Even Bohemia was formerly remarkable for a forest of great extent, a remain of the Hercynia Sylva of antiquity, which extended from the Rhine to Sarmatia, from Cologne to Poland. The Gabreta Sylva was on the south-west of the same country, where a chain of hills now divides it from Bavaria.

Botany. The states which compose the powerful and extensive empire of Austria, have been surveyed with very different degrees of accuracy as to their natural productions. While the botany of Austria proper has been carefully illustrated by Jacquin; and that of Carniola by Scopoli and Hacquet; the flora of Hungary is still very imperfect; and the late acquisitions in Poland by the last and former partitions are as yet in a manner unknown to natural history. The general mild temperature of the Austrian states, their variety of soil and situation, from the lakes and rich levels of Hungary, to the snowy summits of Istria and Carinthia, are a sufficient evidence of the richness of their flora; each year it is augmented by the discovery of new species, and will doubtless long continue to be increased by the investigations of future botanists. We shall follow the plan to which we have hitherto adhered of enumerating, as far as our narrow limits will allow, the principal vegetables, natives of Austria, which for their beauty or use merit particular notice; of these it will be found that a large proportion have been admitted into our gardens, and many more, from the elegance of their form, or glow of colour, have an equal claim to domestication.

Of the natural order of the *Ensatæ*, distinguished by their compressed sharp sword-shaped leaves, several species are found wild in the Aus-

trian dominions, among which may be distinguished five species of iris, the pumila, graminea, sibirica, spuria, and variegata; the gladiolus communis, *corn-flag;* and anthericum ramosum, *branched spiderwort;* all of which have been naturalized in our gardens.

The bulbous-rooted plants of the order Hexandria of Linnæus, remarkable, for the most part, for the beauty of their flowers, and abounding most in the warmer climates, occupy a conspicuous rank in the flora of Austria: a long list of these might be produced, but we shall select only the principal: these are hyacinthus comosus, and ramosus, the *tufted* and *clustered hyacinth;* scilla bifolia: leucojum vernum, æstivum, and autumnale, the *spring, summer,* and *autumn snowflake;* allium victoriale, one of the most stately and ornamental species of the large genus *garlic;* lilium bulbiferum, *orange lily;* L. martagon, *martagon lily;* L. chalcedonium, *turncap lily;* gulanthus nivalis, *snow-drop;* ornithogalum umbellatum, *umbellated star of Bethlehem;* erythronium dens canis, *dog's tooth violet,* one of the earliest beauties of the spring; fritillaria meleagris, *chequered daffodil;* crocus vernus, *spring crocus;* asphodelus ramosus, *branched asphodel;* hemerocallis flava, and fulva, *yellow* and *tawny day-lily;* and lastly, though perhaps superior in beauty to any of the preceding, veratrum album and nigrum, *white* and *black hellebore.*

For the class syngenesia, or the compound flowered, though it contain many species that are natives of Austria, yet as these are for the most part plants of little use, and as little remarkable for their beauty, a short notice will suffice: the most interesting of these to the general reader are arnica montana, used in medicine; prenanthes viminea; carduus mollis and canus, *soft* and *hoary thistle;* tragopogon major, *greater goat's-beard;* scorzonera purpurea, *purple scorzonera;* achillea clavennæ; senecio abrotanifolius, *southernwood-leaved ragwort,* with somewhat hoary finely divided leaves and large bright yellow blossoms; gnaphalium leontopodium, *lion's-foot cudweed;* aster alpinus, *mountain daisy;* artemisia Austriaca, *Austrian southernwood;* and xeranthemum annuum, a pretty plant, an inmate of our gardens, whose radiated purple and white flowers, if gathered when fully blown and kept in a dry place, will retain their beauty the whole winter through.

Of the sedums and their kindred genera it will be sufficient to mention two species of singular beauty, the sempervivum hirtum, *hairy orpine;* and S. moritanum; of these the latter is by far the most elegant plant of its tribe.

To the class decandria belong several interesting plants, of which the following are most worthy of mention; dianthus alpinus and virgineus, *alpine* and *maiden pink;* dictamnus albus, *fraxinella;* saxifraga cæsia; and three species of rhododendron, the hirsutum, chamæcistus and ferrugineum, all of which merit distinction in a genus, every species of which is more than commonly beautiful.

The umbelliferous plants of Austria, as well as those of every other European country, are very numerous; the following are the larger species and the most characteristic, Selinum carvifolium; S. Austriacum; Heracleum Austriacum; Peucedanum Alsaticum; Ligusticum Austriacum; and L. Peloponnesiacum.

The Linnæan class pentandria contains the most beautiful of the indigenous plants of the Austrian dominions, several of which have found their way into our gardens. The moist and spungy sides of the mountains from the Carpathian chain to the heights of Istria, are adorned by the soldanella alpina and aretia alpina, two minute but exquisitely beautiful plants, the former with purple, the latter with white and flesh-coloured blossoms. Among the numerous species of flax, the following very elegant ones are natives of Austria: Linum hirsutum, *hairy flax*; L. flavum, *yellow flowered f.*; L. alpinum, *mountain f.*; L. Austriacum, *Austrian f.*, with large deep-blue blossoms; L. perenne, *perennial f.* The rest of this class that require notice are, cerinthe major, *greater honeywort*; verbascum phœnicum, *purple mullein*; gentiana acaulis, *stemless gentian*, distinguished by its large erect blue bell-shaped blossom, rising immediately from the centre of the leaves; gentiana Pannonica, the most splendid of the whole genus, growing to a considerable height, and bearing its large purple-dotted blossoms in tufts on the top and sides of the stem: gentiana asclepiadea; and G. punctata: the Austrian flora is also graced by several species of primula, as P. auricula; P. integrifolia, P. carniolica, P. glutinosa; by the cyclamen europæum; androsace villosa and lactea; campanula thyrsoidea, remarkable for its pale yellow blossoms; physalis alkekengi, *winter cherry*; and asclepias vincetoxicum, *swallow-wort*.

Of the papilionaceous plants may be enumerated cytisus laburnum, the *greater laburnum*, a tree of some magnitude, adorning the banks of the Danube with its long clusters of golden blossoms; cytisus supinus, Austriacus, and hirsutus; orobus pannonicus; coronilla emerus, an elegant shrub: coronilla securidaca; and coronilla coronata, distinguished by its glaucous leaves, and its bright yellow blossoms; astragalus montanus and pilosus; and fumaria bulbosa, *bulbous-rooted fumitory*.

Of the cruciform or tetradynamious plants it will be sufficient to mention cardamine trifolia; alyssum montanum, *mountain alysson*; draba aizoides and Pyrenaïca, the three last of which are found in our gardens.

Several remarkable plants, inhabitants of the Austrian dominions, arrange themselves under the Linnæan class polyandria; among these may be distinguished two species of Adonis or *pheasant's eye*, the A. miniata and flammea, adorning the fallows with their scarlet petals; papaver alpinus, *alpine poppy*, remarkable by its snow-white flowers; anemone alpina and narcissifolia, *mountain* and *narcissus-leaved anemone*; helleborus viridis, *bears-foot hellebore*; H. niger, *Christmas rose*; and H. hyemalis, *winter aconite*; ranunculus alpestris, *white-flowered mountain ranunculus*; and R. illyricus, a most elegant plant with yellow blossoms, and glaucous hairy leaves: potentilla caulescens; P. Clusiana, a handsome plant with white flowers; and P. nitida, conspicuous for its beautiful flesh-coloured petals, and its glaucous leaves: atragene alpina, adopted into our flower-gardens: rosa alpina, *small alpine rose*; clematis integrifolia, *entire-leaved virgin's bower*; and four species of aconite or monkshood, A. napellus, A. lycoctonum, A. anthora, and A. cammarum, the largest and most showy of the whole genus; nymphæa

lotos, the sacred *lotus* of Egypt and India, has also of late been found in some lakes in Hungary.

The galeated or didynamious plants of Austria are not very numerous; of these the following are the chief, digitalis ambigua; antirrhinum alpinum; salvia Austriaca, sylvestris, and æthiopis; pedicularis rostrata and verticillata; and the *rosemary*, rosmarinus officinalis.

The perennial shrubby plants may be divided into the flowering shrubs, the fruit-bearing, and the forest trees. Of the former class some, as the laburnum, have been already mentioned, the rest with the exception of erica carnea, *flesh-coloured heath*; syringa vulgaris, *lilac*; and tamarix Germanica, *German tamarisk*, are scarcely interesting except to botanists. The common fruit-trees of Europe are largely cultivated in the provinces of Austria, but their list of native fruits is very scanty, the following are the chief; ribes alpinum, *mountain currant*; pyrus nivalis; pyrus cydonia, *quince*; sorbus domestica, the *service*; mespilus cotoneaster, *medlar*; prunus cerasus, *black cherry*; P. avium, *bird cherry*. The forest trees are, loranthus europæus; ulmus campestris, the *elm*; ulmus diffusus, the *wych elm*; tilia europæa, *lime tree*; betula alba and alnus, *birch* and *alder*; quercus robur, and cerris, *common* and *prickly-cupped oak*; rhus cotinus, *sumach*; juglans regia, *walnut*; fagus castanea and sylvatica, *chesnut* and *beech*; carpinus betulus, *hornbeam*; carpinus ostrya, populus alba, nigra, and tremula, *black* and *white poplar* and *aspen*; acer pseudo-platanus and campestris, *sycamore* and *maple*; fraxinus excelsior, *ash*; pinus sylvestris, abies, picea, and larix, the *pine*, the *fir*, the *yew-leaved fir*, and the *larch*.

Zoology. The domestic animals in the Austrian dominions are commonly excellent, particularly the cattle. According to a late traveller* the Hungarian horses have been erroneously estimated from the spirited cavalry supplied by other regions, while the native breed is very small, and the stallions and brood mares are foreign. Many of the native horses run wild, and are sold in great numbers at the fairs, before they have suffered any subjection. The breed of cattle is mostly of a singular colour, a slaty blue; and the Hungarian sheep resemble the Walachian in their long erect spiral horns, and pendent hairy fleece. In the western parts of the Austrian sovereignty, the animals do not seem to be distinguished from those of other parts of Germany.

The large breed of wild cattle, called Urus or Bison, is said to be found in the Carpathian forests, as well as in those of Lithuania and Caucasus. Among the ferocious or wild quadrupeds, may also be named, the bear, the boar, the wolf, the chamois, the marmot, and the beaver. Among the larger birds, the bustard and pelican, are some of the most uncommon: and Carniola produces the strix sylvestris, the tetrao nemesianus, the sturnus collaris, the emberiza, barbata and brumalis, the motacilla, of three uncommon kinds, the hirundo rupestris, the ardea alba, the mergus æthiops, three kinds of the larus, and the anas subterranea.† Even Austria claims some birds, rather peculiar, as four uncommon kinds of the falcon, the strix sabaurita, the motacilla dumetorum, the parus pendulinus, the pratincola krameria, and perhaps others. The Danube, also, boasts of some fishes seldom found in other rivers, among

* Townson, 239. † Pennant, Brit. Zool. ii. Appen.

which is a small and delicate sort of salmon. To enumerate uncommon insects, would be too minute a labour for the design of the present work; but for those of Hungary the travels of Dr. Townson may be consulted.

MINERALOGY. The mineralogy of the Austrian dominions being by far the most various and interesting of any in Europe, it will be proper to consider it with some attention. There is scarcely a province of this extensive territory, from the frontiers of Swisserland to those of Turkey, which cannot boast of advantages in the mineral kingdom; and as it were by a destiny attached to the house of Austria, even the acquisitions in Poland contain one of the most remarkable mines in Europe, the saline excavations of Wielitska. To begin on the north-west and afterwards pursue the description towards the south and east; the mines of Bohemia have been celebrated from ancient times.* Silver is found at Kuttenberg, and at Joachinsthal, on the western frontier towards Saxony, probably a continuation of the veins of that country: this mine was discovered in 1516, and next year were struck from it the crowns of Joachim. Other places of this province also produce this precious metal: and gold has been discovered at Keonstock. One of the most singular products of this province is tin, which is found at Zinwald (that is the tin forest), also on the frontier of Saxony, near Krauppen, at Schlackenwald or Slauka, a few miles to the north of Carlsbad, and at Lauterbach and Schoenfeld in the same district; so that this metal is restricted to the western part of Bohemia; where is also found, at Dreyhacken, a mine of very pure copper. Lead occurs at Bleystadt, or Pleystadt, in the same quarter; and Busching reckons quicksilver among the products of Bohemia, along with iron, magnet, alum, sulphur, vitriol, terra sigillata, talc, and coal. But the precious stones which he mentions, seem to be only coloured crystals. The garnets of Bohemia are however among the most beautiful of the kind. They are chiefly found in clay, mingled with mica, at Meronitz in the mountain of Stiefelberg, whence they are carried to Bilen.† There are other mines of garnets, in the same region, on the west of the highway leading from Prague to Dresden, where they are found with balls of basalt, formed of concentric layers, and some jacinths and chrysolites. The women wash the clay in which the garnets are found; after which they are sifted and arranged according to size; and sold by the pound weight from about three to ten shillings. Many workmen are occupied in cutting and piercing them, for necklaces, and other ornaments; they are polished in facettes, with emery on a piece of freestone, and pierced with a small diamond. This branch of commerce is of great antiquity at Carlsbad, and at Walkirk in Swabia, where twenty-eight mills are occupied in this article only.

Nor is Moravia destitute of mineralogic advantages, producing not only iron in great abundance, but alum, sulphur, and saltpetre. Gold was formerly found in the district of Znoyn or Znain: and silver was lately worked in that of Iglau, both on the confines of Austria.‡

The fertile archduchy of Austria displays few minerals, though there be mines of gold near the abbey Goettwig, and of alum near Krems:

* Busching, vol. vi. 126. French edit. 8vo.
† Journ. des Min. No. iv. 36.
‡ Busching, vi. 420.

saltpetre is, however, prepared in abundance; and at a little distance from St. Annaberg, near the frontiers of Stiria, a rich mine of silver was opened in 1754. The southern provinces of Stiria, Carinthia, and Carniola, afford many important minerals. The iron of Stiria supplies the finest steel, and great quantities are imported into England: it is chiefly found at Eisenerst and Vorderberg; the former, in the district of Ensthal, so called from the river Ens, were discovered in the year 1712; and the others are in the same quarter*. There are considerable lead mines near Pegua on the river Mohr, yielding about 5000 tons yearly; and at Zeyring were silver mines under water since the year 1158. Stiria also affords coal at different places: not to mention minerals of mere beauty or curiosity, among which may perhaps be named the singular blue granite, which according to some is found at Kruglah, or Krigloch, about twenty miles to the east of Bruck: but others say near Villach, in Carinthia. Mr. Kirwan† observes, that the felsite, or blue felspar, which constitutes this granite, was lately discovered near Krieglach in Stiria, by Mr. Widenman; though in another place‡ he calls it the blue granite of Carinthia. This beautiful mineral, may, however, be the production of both countries.

On the east of Stiria extends the duchy of Carinthia, also yielding excellent iron, the mines of Friesach on the north, being particularly famous, as well as those near the sources of the Lyser. In the neighbourhood of Villach, at Bleyberg, are found rich lead mines; and the same place supplies what is called fire-marble or lumachelli.

Carniola, or Krain, abounds with immense caves, and other natural curiosities; but except a few iron works, the mineralogy is little remarkable. On the west, towards the county of Gorz, which produces excellent wines, lies the Ban of Idria, a district immediately subject to the chamber of Inner Austria at Gratz. The quicksilver mines of Idria are celebrated in natural history, poetry, and romance. They were discovered in the year 1499; and the hill of Vogelberg has annually yielded more than 300,000 pound weight of mercury. The common ore is cinnabar; but sometimes the pure quicksilver runs through the crevices. Idria is surrounded with woody hills; and the Vogelberg on the east produces oaks and broom, while the interior consists of red clay, calcareous rock, and a black soft slate, which covers the metallic vein in a southern direction. The deep descent is by ladders, and stairs of stone; and the length of the galleries is computed at 316 paces, or 1580 feet||. The operations in these vast mercurial caverns being pernicious to the health, are sometimes allotted as a punishment to criminals.

The northern parts of Italy, now subject to Austria, have never been remarkable in mineralogy: but on passing into Tyrol several mines occur of ancient reputation, such as that of silver and lead near Lermos; and in the same quarter those of Nasereit in the Verner mountains, about thirty miles north-west of Inspruck, which are opulent in silver, copper, lead, and iron**. Nor is the southern region

* Ferber's Italy, p. 5. † Mineral. i. 326. ‡ P. 339.
|| Scopoli Tentamen de Minera Hydrargyri. Journ. des Mines, No. xxxvi. Sargent's Mine, &c. ** Beaumont, 77. Ferber, 329.

of Trent wholly destitute of mines. It may be proper to remark, that some curious productions have been ascribed to Tyrol, which really belong to the archbishoprick of Salzburg, Zillerthal, in particular being in the latter province.

But the principal mines in the Austrian dominions are situated in the eastern provinces of Hungary and Transylvania. About forty miles to the south of the Carpathian hills are the gold mines of Cremnitz; and twenty English miles further to the south, the silver mines of Shemnitz; cities which have arisen solely from these labours, and thence called mining towns. Shemnitz is esteemed the principal; and the ores are found in what Baron de Born styles metallic rock*. The academy here instituted for the study of mineralogy is highly respectable, and only rivalled by that of Freyberg in Saxony. The mines of Cremnitz also produce some silver. Hungary contains mines of copper at Schmelnitz and Herrengrund, of antimony very rich at Rosenau; and in different parts of coal, salt, and alum. Saltpetre is also produced in considerable quantities: and natron or soda is found in a lake near Kismaria towards the frontier of Transylvania†. Such lakes are commonly white from the soda floating on the surface. But a mineral peculiar to Hungary, and as yet discovered in no other region of the globe, is the opal, a gem preferred to all others by the oriental nations. The opal mines are situated at Czerweniza, a short day's journey to the north of Kaschaw, and nearly under the same latitude with Cremnitz. The hill in which they are found consists of decomposed porphyry; and they only occur at the distance of a few fathoms from the surface, of various qualities from the opake white, or semi-opal, which is also discovered in Cornwal, to that utmost effulgence of iridescent colours which distinguishes this noble gem.

The mines of Transylvania and the Bannat are also numerous and valuable. Those of Najiag, twelve British miles to the north-east of Deva, were pretended to be discovered by a peasant, who said that he had observed a light shining in the evening over the spot. They produce the grey gold ore, being that precious metal mingled with antimony, arsenic, lead, and iron, and sometimes with manganese and zinc‡. They are the richest in all Transylvania, and conducted with the greatest care and exactness. At Ofenbanya, about twenty-five British miles to the north of Karlsburg is found the white gold ore, which also occurs in the hills of Fatzebay, in the same quarter. The country towards the west of Karlsburg presents numerous gold mines near Zalathna: and in the north of this province are those of Kapnick,

* The Saxum metalliferum is, according to the account of Lefevre, who visited these mines in 1788, (J. des. Min. No. xii. p. 39—50.) a porphyry, of white felspar and black mica in rose-coloured jasper, too soft to be polished. Mr. Esmark, a disciple of Werner, who visited them in 1796 (Ib. No. xlvii.) says the basis is felspar passing to hard clay, containing crystals of hornblende, black mica, and sometimes of quartz. Mr. Kirwan describes it as dark green, rarely reddish; but Dr. Townson's account indicates grey with white spots, and he says that Baron de Born might have recognised in that yellowish grey substance, the usual adjunct of opal.

Riesbeck asserts that these mines would be far more productive if they were farmed out by the crown.

† Journ. des Min. No. ii. ‡ Journ. des Min. No. xlvii. Esmark.

Rodna, Felsobanya, and others. Mr. Esmark also mentions those of Verospatak, Kirnik, and Boitza, but some are exhausted. At Ohlapian, not far from Zalathna, is found the finest gold in Transylvania, mingled with gravel and sand. The chief mining town of the Bannat is Orawiza, on the west of a chain of mountains, consisting of micaceous schistus, granite, and metallic rock; between which and Buda are chiefly plains of sand. Towards the south of Orawiza are found mines of copper: and gold and silver at Dognaska to the north.

The salt mines acquired from Poland, alone remain to be described. They are situated, as already mentioned, at Wielitska, eight miles to the south of Cracow, being excavated at the northern extremity of a branch of the Carpathian mountains. The descent is by pits of great depth; and the galleries and chambers are of immense size, commonly supported by timber, or by vast pillars of salt, out of which material, even subterraneous chapels are formed; but travellers have idly exaggerated the splendor and extent of the saline apartments*. The miners work by intervals of eight hours; after which they are drawn up, and their places supplied by others. The revenue arising from these mines was computed at near 100,000*l.* sterling yearly; but it has considerably declined since they became subject to Austria. The salt is of an iron grey colour, sometimes intermingled with white cubes: and sometimes large blocks of salt appear imbedded in marl†. The purest sort is found at the bottom of the mine, and is sparry. The mines extend about 3,600 feet from east to west, and about 200 from south to north. The salt is of the same identic kind with that found in Marmarus, on the other side of the Carpathian chain, or indeed throughout Transylvania, which contains a great number of salt mines, though not of considerable extent.

Mineral Waters. The mineral waters in the Austrian dominions are very numerous, as is to be expected in a country so mountainous, with the exception of the great plain in the west of Hungary, extending upwards of 250 miles in every direction. To instance a few; Tyrol presents those of Sellrain, Meran, Sexten, Prax, Agums, Brutz in the upper valley of the Inn, Trasp, Rabi, Pei, and others. In Stiria there are several; nor are Carinthia and Carniola destitute of this advantage. Austria proper presents those of Baden; and Bohemia those at Carlsbad, Toeplitz, Agra, and Desny. Mineral springs abound in Hungary, as at Gran, Buda, Groswardin, where the hot baths are frequented by the neighbouring Walachians. In the north are those of Rank, Bertfeld, and others.

Natural Curiosities. Among the natural curiosities may be named, the grand Alpine scenes of Tyrol, the glaciers and peaks of the Brenner. At Gannowitz in Stiria is a fountain, whose waters are said to be warm in winter and cold in summer: a common error, the deception consisting in their preserving the same temperature. The calcareous hills of Carinthia afford many singular scenes; which are however, exceeded by those of the Carnian Alps, or Birnbaumer mountains, of Carniola. In the latter country, near Adlsberg, is said to be a grotto of prodigious extent, displaying spaces sufficient for the

* Coxe's Pol. i. 200. † Townson, 388.

erection of villages, and containing natural amphitheatres, bridges, &c*. Near the entrance the river Poig, which rises at about a mile distant, throws itself into the hollow of the rock, and passes under the grotto, which was perhaps the ancient course of the river. The grotto of St. Mary Magdalen, in the same district is remarkable for beautiful pillars; and that of Lueg for extent and the variety of stalactitic figures. Nor is that near St. Serf unworthy of notice. But the chief natural curiosity of Carniola is the lake of Cirknitz, called by Dr. Brown the Zirchnitzer See. That traveller informs us that it is about two German, or more than eight English miles in length, by four of the latter in breadth. In the month of June the water descends under ground, through many apertures at the bottom; and in September it re-ascends with considerable force; thus yielding rich pasturage in summer, while in winter it abounds with fish. The calcareous hills and islands of Dalmatia contain similar curiosities; as the lake Jesero in the isle of Cherso, which only diffuses its waters every fifth year†; several curious caverns; and prodigious quantities of fossil bones, of horses, oxen, sheep, &c. but doubtful if any be human; nor have any decidedly such, been discovered in any region of the globe. Austria, Bohemia,‡ and Moravia, display few natural curiosities; but those of Hungary are numerous, besides the Alpine scenes of the Carpathian mountains. There is a cavern of prodigious extent near Szadello, about thirty British miles north-west of Kashau||. It is, like all the other large caverns, in a hill of lime-stone; and is so crowded with large pendent stalactites as to become a dangerous labyrinth. Near Szalitze, in the same quarter, is another renowned cavern, which, like that mentioned in the account of France, contains a small glacier. At Demanovo, about sixteen British miles to the east of Rosenberg, is another remarkable cave, containing many bones of wild animals which have taken shelter there, as not unusual in the caves of Germany.

* Busching, vii. 60. † Fortis, 429.

‡ Near Trautenau is a most singular assemblage of natural towers of stone, from 60 to 150 feet in height. This stony forest is of great extent, and is by some supposed to be the skeleton of a hill. Riesbeck, ii. 148.

|| Townson, 313.

PRUSSIA.

CHAPTER I.

HISTORICAL GEOGRAPHY.

NAMES.—EXTENT.—BOUNDARIES.—ORIGINAL POPULATION.—PROGRESSIVE GEOGRAPHY.—HISTORICAL EPOCHS AND ANTIQUITIES.

THIS kingdom, which only commenced with the eighteenth century, has by gradual accessions become so extensive, as deservedly to rank among the first powers of Europe. The dominions of Prussia were small and scattered, till the acquisition of Silesia, and afterwards of a third part of Poland, gave a wide and stable basis to the new monarchy.

NAMES. This region was faintly known to the ancients, who mention various tribes that possessed it: and the amber, which here only was found in such quantities as to form a regular article of commerce, greatly contributed to its celebrity. But antiquarian disquisitions are foreign to the present purpose; and it will be sufficient to observe that the name of the country originates, according to some, from the Pruzzi a Slavonic tribe; but more probably, according to others, from the name of *Russia*, and the Slavonic word *Po*, which signifies near, or adjacent. Thus the Polabæ were confessedly so called, because they were situated upon the Elbe, which is called Labe in the Slavonic dialect. Helmoldus*, who wrote in the twelfth century, and is the most ancient chronicler of these regions, mentions

* Lib. i. cap. iv.

the Pruzzi, or Prussians, among the chief Slavonic tribes: nor is the name unknown to Adam of Bremen, a writer of the preceding century.

EXTENT. Exclusive of small detached territories, the kingdom of Prussia now extends from Hornburg and the river Oker in the country of Halberstadt, the furthest western connected district, to the river Memel, or about 600 miles. The breadth from the southern limit of Silesia to Dantzick, exceeds 300 miles. On the east and south, Prussia now borders on the dominions of Russia and Austria, and the western limits adjoin to the bishoprick of Hildesheim, if ambition have not extended them still further. Before the recent acquisitions in Poland the number of Prussian subjects was only computed at 5,621,500, in a total extent of 56,414 square miles, that is about ninety-nine to the square mile. At present they probably amount to about 8,000,000: including the margraviate of Anspach and Bayreuth, computed at 400,000; and the last acquisitions in Poland estimated at 2,100,000 inhabitants*.

ORIGINAL POPULATION. The original population of Prussia appears, from Tacitus and Pliny, to have consisted of the Peucini and Æstii, Gothic tribes bordering on the Venedi who were Slavons. The amber of the Æstii, who seem to have been merely a tribe of the Peucini, continued to be celebrated in the time of Theodoric; but at what precise period these original inhabitants were expelled, or subdued by the Slavonic tribes on the east, remains uncertain. Suffice it in general to observe, that the Slavonic tribes extended widely over the north of Germany, after the old Gothic inhabitants had crowded to the more fertile regions of the south, in consequence of the decline and fall of the Roman empire. But the re-action of the knights of the Teutonic order, in the twelfth and following centuries, destroyed great numbers of the Slavons, and in some measure restored the original Gothic population. Yet one half of the Prussian population must still be considered as Slavonic; as to the former Pomeranians must now be added a numerous accession of Poles. In general the Slavons are far more enslaved by their chiefs than any of the Gothic nations: and it is believed that the Polish people, however they may execrate the iron rod of Russia, will have no cause to regret, that they have passed under the Austrian and Prussian sceptres.

PROGRESSIVE GEOGRAPHY. The progressive geography of those provinces which now constitute the Prussian territory, would form an embroiled and multifarious topic. Ptolemy's eighth map of Europe presents a very confused idea, and imperfect information. The voyage of Ohter, in the reign of Alfred, affords a faint dawn of modern knowledge; which is increased by the descriptions of Adam of Bremen, and Helmoldus. One of the most singular features in the geography of these regions, during the middle ages, is the existence of Julin, a city of great extent and commerce, on the right bank of the Oder in Pomerania, which was destroyed by Waldemar I, king of Denmark, so that even the name hardly now exists in a place called Wollin. Further to the east the Slavonic tribes on the Baltic, continued

* Gaspari Allgem. Jahrbuch, 1800. Weimar.

Pagans to a late period; and the country was little known, or visited, except by a species of crusaders, who went to assist the Teutonic knights in subduing those Saracens, as they were styled in the ignorance of the times.

Historical Epochs. As this kingdom is recent, and composed of several ancient states, its historical epochs, and antiquities are of course complex. Not to mention the smaller provinces, among which is the distant principality of Neufchatel, on the frontiers of France and Swisserland, Prussia may be regarded as consisting of four great divisions, the electorate of Brandenburg; the kingdom of Prussia proper; the large province of Silesia; and a third part of the ancient kingdom of Poland. As the family which now rules those extensive domains was originally the electoral house of Brandenburg, it will be proper first to trace the progress of its power.

1. The German genealogists derive the house of Brandenburg from Thassilo count of Hohenzollern, who lived about the ninth century. Sigefred, a Saxon count, having married the daughter of Henry king of Italy, was appointed Margrave of Brandenburg, A. D. 927; but many centuries elapsed before this dignity fell to the ancestor of the present family. The province had been for some centuries chiefly possessed by Slavonic nations, but the Margrave soon raised it to considerable distinction. The succession of these potentates, of various families, and their petty wars, would little interest the reader.

2. The emperor Charles IV, in 1373, assigned Brandenburg to his second son Sigismond, who, in 1415, being then emperor of Germany, sold this Margravate and Electorate, to Frederic burgrave of Nuremburg, for 400,000 ducats. Frederic, the ancestor of the present reigning race, displayed considerable abilities.

3. Joachim II, elector of Brandenburg, embraced the Lutheran religion in 1539, which has since been the ruling system of the state.

4. John Sigismond becomes duke of Prussia in 1618. This succession will be explained under the next division of the historical epochs.

5. Frederic William, surnamed the Great Elector, succeeded his father in 1640; and in 1656 compelled the king of Poland to declare Prussia an independent state, it having formerly been held of the Polish sovereigns. This prince is highly praised by his royal descendant, the author of Memoirs of the house of Brandenburg, as the chief founder of the power of that family. He was succeeded in 1688 by his son,

6. Frederic III, who supporting the emperor in the contest for the Spanish succession, was by him declared king of Prussia; under which title he was proclaimed at Konigsberg, on the 18th day of January, 1701, he himself placing the crown upon his head.

7. Frederic William II ascended the throne in 1713; and in 1721 founded the city of Potsdam. But he was chiefly remarkable as the father of that great prince Frederic II*, who ascended the throne in 1740, and died in 1786, after a long and glorious reign; the most

* In the regal genealogy the name of Frederic alone is considered as distinct from that of Frederic William.

memorable and lasting event of which was the acquisition of Silesia from the house of Austria in 1742.

8. The short reign of his nephew is known to every reader. The failure of the Prussian tactics in France and Poland, convinced Europe that the great Frederic had been the soul of the machine. But these checks were recompensed by the completion of the Prussian acquisitions in Poland. The reign of his son, the present monarch, has hitherto been distinguished rather by prudence than enterprize.

The historical epochs of Prussia proper, are not deserving of much elucidation. The knowledge of the ancients concerning this country has already been explained. A faint dawn of history, in the middle ages, discloses at the mouth of the Vistula, the Pruzzi, a Slavonic nation, who were afterwards subdued by the knights of the Teutonic order.

1. This order originated A. D. 1190, in the camp of the Crusaders before Acca, or Acre, from some citizens of Lubec, and Bremen, who united to relieve the wants of their German brethren. Next year a bull of institution was obtained from the Pope, ordering them to wear a black cross on a white mantle, and to follow the rule of St. Augustin, with all the privileges granted to the Knights Templars. The crusades to Palestine having failed, the knights directed their enterprize against the pagans of the north of Germany, A. D. 1227; and in a few years conquered Prussia, and founded several cities.

2. The knights thus established in Prussia directed their efforts against the Lithuanians, and other pagans in the east. But repeated wars with Poland, were less fortunate; and about 1446 the four chief cities of Prussia, Elbing, Thorn, Konigsberg, and Dantzick, withdrew their allegiance from the Teutonic order, and claimed the protection of Poland.

3. In 1466 Casimir king of Poland forced the Teutonic order to abandon to him the eastern part of Prussia, and to pay homage for the western part.

4. Albert of Brandenburg, grand-master of the order, obtained from his maternal uncle, Sigismond king of Poland, the hereditary investiture of all that the order possessed in Prussia, and embraced the Lutheran religion. But particular grand-masters continue to be appointed by the emperor of Germany.

5. In 1569 Joachim II, elector of Brandenburg, had obtained from the Polish monarch the succession of the duchy of Prussia, in case the possessor died without heirs; but this addition of power and territory did not take place till 1618, when John Sigismond elector of Brandenburg acquired this duchy; and in 1621 his successor received the solemn investiture from the king of Poland. Nor was it, as already mentioned, an independent sovereignty till 1656, after which period the chief events may be traced under those of Brandenburg.

Silesia affords few materials for history. This country was formerly a Slavonic province of the Polish dominion; but in the fourteenth century was seized by John of Luxemburg, king of Bohemia, (February 1339,) and passed with that sovereignty to the house of Austria. The house of Brandenburg certainly had some ancient claims to this

provinces, which were finally ascertained by the sword in 1742, as already mentioned.

As not only the recent acquisitions in Poland are of far more comparative consequence to Prussia, than either to Austria or Russia; and as in fact this sovereignty is in possession of the metropolis, and all the chief cities, and ports of Poland, and may be said to exist only on the basis of that ancient kingdom, which it represents in the modern balance of power, it will be proper here to repeat, in a few words, the chief epochs of the Polish history.

1. Even in the Roman times Poland was chiefly possessed by the Sarmatæ, or Slavons; and the Poles pretend to trace their dukes from the sixth century. But the authentic history only begins with Piast, A. D. 842. In 992 the christian religion was introduced.

2. Uladslas, duke of Poland, assumed the title of king A. D. 1320; and was succeeded by his son Casimir surnamed the Great.

3. The house of Jagellon dukes of Lithuania ascended the Polish throne 1384, and ruled till 1572, in hereditary succession, though with pretended election.

4. The throne of Poland becomes merely elective in the person of Henry de Valois 1574; but it was afterwards chiefly contested by native princes, and by the electors of Saxony.

5. John Sobieski, king of Poland, in 1683 forced the Turks to raise the siege of Vienna, which was the last valiant action achieved by the Poles.

6. The recent annihilation of the monarchy.

ANTIQUITIES. From this general view of the component parts of the Prussian history it will appear that few ancient monuments can be expected in regions, where even a rude knowledge of the arts is comparatively so recent. Some Slavonic idols, cast in bronze, constitute almost the only pagan antiquities: and the castles, and churches, erected after the introduction of the christian religion, have few singularities to attract particular attention. The Polish coinage begins about the twelfth century, and is upon the German model.

CHAPTER II.

POLITICAL GEOGRAPHY.

RELIGION.—ECCLESIASTIC GEOGRAPHY.—GOVERNMENT.—LAWS.—POPULATION.—COLONIES.—ARMY.—NAVY.—REVENUES.—POLITICAL IMPORTANCE AND RELATIONS.

RELIGION. THE ruling religion of Prussia is the protestant, under its two chief divisions of Lutheran and Calvinistic. But after the recent acquisitions in Poland it would seem that the greater number of the inhabitants must be Roman catholic. The universal toleration which has been wisely embraced by the Prussian monarchs, has had its usual effect of abating theological enmity, and the different sects seem to live in perfect concord.

ECCLESIASTIC GEOGRAPHY. The ecclesiastic geography of Prussia would be at once little interesting, and of difficult detail. The bishopricks in Poland and Silesia seem to retain their ancient limits, while the power of the prelates is considerably abridged.

GOVERNMENT. As no vestige of any senate or delegates from the people is known in this kingdom, it must be pronounced an absolute government; but the spirit and good sense of the nation unite with the wisdom and mildness of successive monarchs, (who have uniformly wished to invite foreign settlers by views of ease and freedom, instead of expelling their own people by rigour,) to render the sovereignty as conciliatory, and perhaps more beneficent, than if joined with a venal senate.

LAWS. The late great monarch reformed many abuses in the laws; but it cannot be disguised that the tenor of his government was too military, a fault inherent in the Prussian system. In some respects, it is doubtless unavoidable, as must ever be the case, in establishing a new power. And when we behold every petty prince in Germany, surrounded by the idle parade of a little army, which, far from being necessary at home, is often sold to other states, we cannot wonder that the acquisitions in Silesia, and in Poland, must be maintained by armed force, instead of ancient attachment and habits of subjection; especially when we consider that Prussia is environed by the great military powers of Russia and Austria. All political plans must be weighed by the circumstances; and this dire necessity must exist till the benignity of the government shall have gradually secured the firm attachment of its new subjects.

POPULATION. Before the acquisitions in Poland, this kingdom was supposed to contain only about five millions and a half of inhabit-

ants, including one million and a half in Silesia. But the late great acquisition in Poland, has greatly enlarged the number of inhabitants, which may be about eighty to the square mile.*

COLONIES. No foreign colonies have emigrated from Prussia; and it has been indeed a chief object with the monarchs, to colonize the country itself.

ARMY. The army is supposed to amount to about 200,000, including about 40,000 cavalry. The tactics of the late able sovereign conferred distinguished reputation on the Prussian battalions, but they are now supposed not to exceed the Austrian; and military men consider both as inferior to those of Russia, who seem to be justly regarded as the best troops in Europe.

NAVY. The acquisition of Dantzick, and some other ports in the Baltic, may in time place Prussia among the maritime powers; but as little is to be gained or apprehended at sea, it is natural that almost the sole attention should be paid to the land service, which can alone secure the country against the exorbitant power of Russia; for Austria has been so much enfeebled by the recent contest with France, that many years must elapse before Prussia can have any apprehensions from that quarter.

REVENUES. Before the additions of Polish territory, the revenue was estimated at 3,880,000*l.* sterling, and the expense of the army at 2,275,000*l.*† Frederic II laudably expended about half a million sterling yearly, in the improvement of his dominions. The entire revenue of Poland was not computed to exceed 439,546*l.* sterling. If we even suppose half of this added to the Prussian revenue, the result would not be important; but as the Polish aristocracy carefully guarded against taxes to be defrayed by themselves, it is to be presumed, that a new and more legitimate form of government will compel them to contribute largely to the expenses of the state: which, considering the bondage in which they have held the peasantry, there will be no cause to regret. And it may be expected, from the spirit of the Prussian government, that the sums thus justly exacted from the rich, will be in a great measure expended in the improvement of the acquired country, which may thus yield a fair revenue proportioned to its extent. The late great monarch, clearly foreseeing the destructive consequences of the funding system, which has been embraced by some other European powers, with his usual ability pursued the opposite plan of laying up a treasure to serve in times of necessity, instead of adding the oppression of taxation to the horrors of war. This treasure is said to have been expended by his immediate successor: but still Prussia has the supreme advantage of freedom from national debt, whence the smallness of the revenue has never been regarded as detracting from its position among the chief European powers.

POLITICAL IMPORTANCE AND RELATIONS. The political importance and relations of this kingdom, have impressed the European history of this country with new and distinct features. What Poland

* See the note at the end of this chapter.

† Bœtticher, p. 50.

would have been, if blessed with a happier government, and executive energy, may be conceived from the present appearance of Prussia, exclusive only of one circumstance, that of contiguity with the Ottoman dominions. An alliance with Prussia would be indeed of supreme importance to the Turkish empire; nor can it be the interest of Prussia to permit Russia to extend her aggrandizements. Yet the Porte has few advantages to offer, while Russia might secure the alliance of Prussia, by conceding a further part of Poland to balance any great accession of Turkish territory.

In regard to the other chief powers of Europe, England, France, Russia and Austria, an alliance of the first with Prussia has repeatedly been enforced by circumstances; but it cannot be disguised that there is a more necessary and important connexion between Prussia and France, as both have cause to be jealous of the Austrian power, which France can essentially injure, while England is by nature debarred from any preponderating interference. But a chief province of Prussian politics must be the defence of the country against the arms and influence of Russia, for which purpose a most important step would be a firm alliance, cemented by every political tie and interest, between Prussia, Denmark, and Sweden; which, if the Russian empire remain undivided, will be the sole barrier of continental independence*.

* The following estimate of Prussian population is compiled from the subdivisions of Hoeck, edit. 1801:

Eastern Prussia	940,000
Western Prussia	521,625
Southern Prussia	1,100,000
New Eastern Prussia	709,000
A part of Poland incorporated with Silesia	74,000
Pomerania	472,957
Brandenburg	755,577
New March	279,584
Magdeburg	275,262
Halberstadt	111,875
Minden	67,952
Ravensburg	81,812
East Friesland	102,594
Cleves	100,000
Mærs	17,000
Mark	121,984
Gelder	48,000
Tecklenburg	17,234
Lingen	23,432
Silesia	1,747,065
Anspach	215,256
Baireuth	205,440
Neufchatel and Valengin	42,500
	8,021,149

The Revenues he computes sometimes in dollars, sometimes in florins, and in such minute sub-divisions that the calculation would be very laborious.

CHAPTER III.

CIVIL GEOGRAPHY.

MANNERS AND CUSTOMS.—LANGUAGE.—LITERATURE.—EDUCATION.—UNIVERSITIES.—CITIES AND TOWNS.—EDIFICES.—ROADS.—INLAND NAVIGATION.—MANUFACTURES AND COMMERCE.

MANNERS AND CUSTOMS. THE manners and customs of a country composed of such various inhabitants, recently united under one sovereignty, must of course be discordant. Silesia, Poland, and other Slavonic regions, may be supposed to contain many peculiarities, which distinguish them from the Germans. The reign of the great Frederic, who entertained a predilection for the French language and manners, contributed to impart a similar tinge to his subjects; yet travellers do not appear to have been much impressed with any striking dissimilitude between the manners of the Prussians and those common to the other Germans. They have indeed remarked, that, in comparison with the Saxons, who are a lively and contented people, the Prussians appear dull and gloomy; a character which they impute partly to the military government, and partly to the general anxiety which must have been excited by the repeated dangers to which their country was exposed, when contending with the powers of Russia and Austria. As to the Poles, they seem full of life and action, but their features and general appearance are rather Asiatic than European. "Men of all ranks generally wear whiskers, and shave their heads, leaving only a circle of hair upon the crown. The summer dress of the peasants consists of nothing but a shirt and drawers, of coarse linen, without shoes or stockings, with round caps or hats. The women of the lower class, wear upon their heads a wrapper of white linen, under which their hair is braided, and hangs down in two plaits. I observed several of them with a long piece of white linen hanging round the side of their faces,

The Prussian army, according to a particular table, amounts to 178,897 infantry, and 39,867 cavalry; forming with artillery, &c. a total of 237,089.

The intelligent author of *La Prusse, et sa neutralité*, 1800, 8vo. estimates, p. 15, the population at more than nine millions, but he is a panegyrist. The revenue he puts, p. 19, at above five millions sterling; and justly observes that this sum must be estimated, not in itself, but as compared with the cheapness of provisions, &c. so that it equals a far higher nominal revenue: and there is no national debt. The army, he says, p. 25, contains 224,144 men: there is no marine, the army requiring undivided attention.

and covering their bodies below their knees: this singular kind of veil makes them look as if they were doing penance.

"The dress of the higher orders, both men and women, is uncommonly elegant. That of the gentlemen is a waistcoat with sleeves, over which they wear an upper robe of a different colour, which reaches down below the knee, and is fastened round the waist with a sash or girdle; the sleeves of this upper garment are, in warm weather, tied behind the shoulders; a sabre is a necessary part of their dress, as a mark of nobility. In summer, the robe, &c. is of silk, in winter, of cloth, velvet, or stuff, edged with fur. They wear fur caps or bonnets, and buskins of yellow leather, the heels of which are plated with iron or steel. The dress of the ladies is a simple polonaise or long robe, edged with fur."* The same author observes that the Polish peasants differ widely in their dress from the Russian; the former in particular shaving their heads, and leaving only a circle of hair in the middle, while the Russians wear their hair down to their eyebrows, and over the ears, and cut it short around the neck.

The manners and customs of the people of Silesia seem to resemble those of their neighbours the Bohemians; but both races have been so much melted down into that of the Germans, that the peculiar features are minute and unimportant.

Language. The ruling language of Prussia is the German, which, it is probable, may in time supplant the Polish, in those parts which are subject to Prussia and Austria.

Literature. The literature of Prussia may well be conceived to be of recent origin; nor even after the restoration of letters did any remarkable author arise in the electorate of Brandenburg. But Dantzick was the native country of Cluverius, an eminent geographer; and Copernicus, a great name in astronomy, was born at Thorn, as his predecessor Regiomontanus was at Konigsberg, his name being a Latin translation of that of his birth-place. Silesia has likewise few pretensions to literary fame, nor are those of Poland highly illustrious. Kadlubko, the most ancient Polish historian, wrote in 1223; and since his time there has been a succession of Latin chroniclers. But as the exertions of German genius in the native language have been little known till the present century, the literature of Prussia has few pretensions, and must yield to that of Saxony, the classical seat of German letters. Frederic the Great had a mean opinion of German literature; and, though he wrote in French, must be classed among the most distinguished authors of his kingdom. Nor is count Hertsberg, his minister, without merit. Among the other names, either natives, or who flourished in Prussia, may be mentioned Ramler the poet, Nicolai an original writer of Romances, &c., Busching the geographer, Spalding, and Mendelsohn.† Nor has Prussia yet produced any artists, painters, sculptors, or architects, of distinguished reputation.

Education. The state of education in this country seems to be equally neglected as in the far greater part of Europe. The number of recruits wanted for the army, and the consequent uncer-

* Coxe's Trav. into Pol. &c. i. 194. † Riesbeck's Trav. iii. 44.

tainty of destination for life, must singularly impede the national instruction.

UNIVERSITIES. There are, however, several universities, such as that of Frankfort on the Oder, founded by Joachim elector of Brandenbur in the year 1516. Konigsberg in Prussia was founded in 1544. Of the Polish universities Cracow has fallen to Austria, and was founded in 1364; and Wilna, founded in 1570 to Russia. Posna or Posen has become subject to Prussia.

CITIES AND TOWNS. Among the chief cities of Prussia must first be mentioned Berlin, situated on the banks of the river Sprey, and regularly fortified. It was founded in the twelfth century, by a colony from the Netherlands, and contains upwards of 140,000* inhabitants, being about four miles and a half long, and three wide; but within this enclosure are many gardens, and sometimes even fields, nor is it easy to reconcile 6000 houses, as enumerated by Reisbeck, with the number of inhabitants computed by Bœtticher. However this be, the city is more remarkable for the elegance of the buildings, than for its wealth or industry, many beautiful houses being let in stories to mechanics.

KONIGSBERG. Next to Berlin may be mentioned Konigsberg, of which the population is computed at about 52,000. This city was founded in the thirteenth century, and is well fortified. It maintains a considerable trade by the river Pregel, which flows into the gulf of Dantzick.

BRESLAW. Breslaw, the capital of Silesia, has been long celebrated as one of the most beautiful cities in Germany. It is of uncertain antiquity, but was destroyed by the Tartars in the thirteenth century. The population is at least equal to that of Konigsberg; and it has several manufactures, the linens of Silesia being particularly celebrated. The ruling religion is that of Luther.

WARSAW. Among the chief cities of Prussia must not now be forgotten Warsaw, the former capital of Poland; and Dantzick, an independent city of ancient fame. Warsaw stands partly in a plain, partly on a gentle ascent rising from the Vistula, but the appearance is melancholy from the general poverty of Poland under its former unhappy government.† The population was computed at 70,000, including the unfortunate suburb of Praga; but it must have been much thinned by the destructive sword of Suwarrow. Yet Hoeck states it at 66,572.

DANTZICK. Dantzick contains about 36,000 inhabitants, and was known as a commercial town even from the tenth century. It was considered as the chief city of the Hanseatic league, and was enlarged and adorned by the knights of the Teutonic order. It must still be considered as the chief staple for the exportation of the corn and the other products of Poland; but its commerce has been for some time on the decline.

In the countries removed from the southern limits of ancient civilization, any formal enumeration of cities becomes less important, because those places which make an appearance on maps often derive

* Hoeck says 142,099; houses 6059. † Coxe's Pol. i. 206.

their sole importance from their situation amidst surrounding deserts; and the expected city becomes upon examination, an insignificant town. Yet a few other cities of the Prussian dominions deserve geographical enumeration, in a progress from the more ancient territories in the west, to the recent acquisitions in the east.

OTHER TOWNS. In the electorate of Brandenburg, and in the adjoining duchy of Magdeburg on the west, may be named Brandenburg, a small city of 6000 inhabitants; and Frankfort on the Oder, which contains about 16,000.

POTSDAM. Potsdam, a recent city, is situated on an island, amidst lakes and canals, and no expense has been spared in its decoration. The royal castle was built in 1663, and it has since been a favourite residence of several Prussian monarchs. The inhabitants are computed at 26,000. The other cities, or rather towns in Brandenburg, seldom contain 5000 inhabitants; but the duchy of Magdeburg presents the capital so called, which is supposed to hold about 26,000 souls, and is strongly fortified with a citadel on an isle in the Elbe. This city dates its origin from the time of Charlemagne; and can boast of elegant streets and flourishing manufactures. The Imperialists taking it by storm in 1631, a dreadful slaughter ensued, the inhabitants who perished being computed at about 10,000. In the same duchy, but disjoined by part of Upper Saxony, stands also Halle on the Saale, more than fifty miles to the south of Magdeburg: the inhabitants of Halle are computed at 21,000. Nor must Halberstadt, the capital of an adjoining principality be omitted, as it contains about 12,500 souls; in which number it is rivalled by Quedlinburg in the same province. It may be remarked, in passing, that the Westphalian dominions of Prussia present no city of much account, and the remote town of Neufchatel contains only about 6000 souls.

On proceeding to Pomerania on the north first occurs Stettin, a city on the Oder of some trade, and about 18,000 inhabitants. Those of Stargard, in further Pomerania, are not estimated at above 6000.

In Prussia, properly so called, may be named Elbing, which is supposed to hold 14,000 souls. The other secondary towns rarely exceeded 3000 inhabitants, till acquisitions of adjacent territory gave to Prussia Thorn, with a population of 10,000. Excepting Breslaw, the capital, already mentioned, there are only three towns in Silesia, which contain more than 6000 inhabitants; namely, Glogau, Hirschberg, and Schweidnitz. Nor if we exclude Warsaw and its suburbs, do any of the towns recently acquired in Poland even equal this population.

EDIFICES. Some of the most splendid edifices of this country adorn Berlin the capital, such as the palace and the theatre. But the other grand buildings seem not to have impressed travellers with veneration, being barracks for soldiers and the like.* And the city itself is almost entirely built with brick, though the fronts of the houses are disguised with stucco. The palace at Potsdam deserves superior applause; and on an eminence near that city, stands the royal villa of Sans Souci, which, however, can claim no grandeur of external architecture. Konigsberg, and Dantzick, also offer to view respectable

* Wraxall's Mem. i. 101.

public buildings; but, in general, this kingdom yields even to Russia in this respect.

INLAND NAVIGATION. The advantages of inland navigation seem little known or cultivated in the Prussian dominions; and though several small canals might be mentioned, yet they rather belong to the office of the topographer than to a general system of geography.

MANUFACTURES AND COMMERCE. If we except the linens of Silesia, the manufactures of the Prussian dominions are of small importance. Yet they afford for home consumption, glass, iron, brass, paper, and woolen cloth: and Frederic II introduced a small manufacture of silk. Even the exports of Dantzick consist almost entirely of timber, corn, tallow, and similar articles.

Nor if we except the ancient staple of grain so abundant in the level plains of Poland, can the commerce of Prussia appear in an important light. Amber is by nature, constituted a monopoly of the country, but fashion has rendered this branch of commerce insignificant. Yet among the considerable exports may be named excellent timber of all kinds, skins, leather, flax, and hemp; nor must the linens of Silesia be passed in silence, many of which are sent into Holland, and sold under the name of Dutch manufacture. In return, Prussia receives wine, and other products of more southern and favoured countries*.

* For more minute particulars Hoeck may be consulted. The amber amounts to near 200 tons annually. In 1777 there were in further Pomerania 219,991 mulberry trees; yet the pure silk is only computed at 680 pounds weight. Brandenburg exports timber from Hamburg, to the amount of 1,000,000 of dollars. In Silesia (1796) there were 40,603 persons employed in the linen manufacture; and 13,540 in the woolen.

CHAPTER IV.

NATURAL GEOGRAPHY.

CLIMATE AND SEASONS.—FACE OF THE COUNTRY.—SOIL AND AGRICULTURE.—RIVERS.—LAKES.—MOUNTAINS.—FORESTS.—BOTANY.—ZOOLOGY.—MINERALOGY.—MINERAL WATERS.—NATURAL CURIOSITIES.

CLIMATE AND SEASONS. THE climate of the Prussian dominions is upon the whole, cold and moist. That of Brandenburg, which is an extensive level of sand, and that of Pomerania, may be regarded as more free from humidity, than that of Prussia proper, which, as Busching informs us*, has about eight months of winter, the autumns being often deluged with rain. The northern part of Poland, which has fallen under the Prussian sceptre, abounds with forests and marshes, which cannot be supposed to render the air salubrious. The lower parts of Silesia are regarded as the most healthy and fertile provinces of the monarchy: but the southern and western parts of that duchy, bordering on elevated mountains, long covered with snow, are exposed even in summer to severe freezing gales.

FACE OF THE COUNTRY. In considering the general appearance of these extensive regions, Brandenburg is a sandy and barren country, but Prussia proper formerly abounded in woods, and displays superior fertility, a character which may also be extended to Prussian Poland, an immense plain. Silesia, on the contrary, displays a pleasing diversity, being level and open towards Poland, but separated from Hungary on the south, by the Carpathian mountains, a branch of which, proceeding north-west, divides this country from Moravia and Bohemia. It is every where watered by the Oder, and its tributary streams: nor is there any deficiency of rivers in the other parts of the Prussian sovereignty.

SOIL AND AGRICULTURE. The soil of Brandenburg is meagre, and even the space between Berlin and Potsdam resembles a wilderness; but that of Prussian Poland is loamy and fertile. The northern extremity of Silesia shares the sandy soil of Brandenburg, yet this province is in general extremely productive, and abounds in fruits and culinary vegetables.

Agricultural improvements are little known, and Brandenburg chiefly produces scanty crops of rye: but Prussia proper, and the Polish provinces display every kind of grain, and esculent plant, that

* iii. 5.

can flourish under such a latitude; and among the productions of Silesia must be classed maize, and even vines, but the wine is of inferior quality.

Such are the general ideas to be derived from Busching, and other German geographers; but an intelligent traveller of our own country has thrown a stronger light on this important topic, and a few of his observations shall be here transcribed.* The soil of Prussia proper, he represents as sandy and ill-cultivated, yet the peasants, though oppressed by heavy taxation, being free from the wanton extortions, and capricious personal services, exacted by the Polish aristocracy, displayed signs of comparative ease and prosperity. The soil being light, two oxen, or sometimes even a small horse and a cow, are sufficient to draw the plough. The chief crop was buck-wheat, which they found more profitable than barley; and this grain was generally cultivated, along with a few Swedish turnips, except in the neighbourhood of Dantzick, where the abundance of manure assured plentiful crops of wheat. In different parts of Silesia the land is let in farms, as in England, and the peasants hired as day labourers; while under the detestable government of Poland they were mere slaves, and every avenue to industry was barred. In speaking of the continuous sandy soil of Brandenburg, he observes, "they find that the only very profitable crop upon these sands is buck-wheat, which they sow in large quantities, and they get a product which equals the best soils applied to that grain: when a piece of land has been more carefully managed than ordinary, it will yield a good crop of rye; but as to wheat or barley, it is hardly to be seen." Between Berlin and Saxony he finds a continuation of the same crop, with turnips and rye, which he supposes to be the sole agricultural products in these regions. In Saxony the soil becomes a good loam, yielding tolerable crops of wheat.†

Rivers. Among the chief rivers of the Prussian dominions may be first mentioned the Elbe, which rises in the south of Bohemia, and pervades the duchy of Magdeburg. The Sprey, which passes by Berlin, falls into the Havel, a river tributary of the Elbe. The Oder, the Viadrus of the ancients, may be regarded as a river entirely Prussian, it rises in the mountains of Moravia, and after watering Silesia, Brandenburg, and Pomerania, joins the Baltic, after a course of about 350 miles.

Vistula. Next appears another noble stream, the Vistula, which rising in the Carpathian mountains, passes Warsaw, and joins the sea near Dantzick, after a circuit of about 450 miles. The Pregel passing by Konigsberg, springs from some lakes and marshes in Prussian Poland; and the Memel, a superior river, now forms, in part, the Prussian boundary on the east.

Lakes. The lakes in the Prussian dominions are numerous, especially in the eastern part, where among others may be mentioned the Spelding See, which, with its creeks, extends more than twenty British miles in every direction. That region contains many other lakes, which supply the sources of the river Pregel. At their estuaries the

* Marshall's Travels, iii. 240, &c. † Ibid. iii. 288.

rivers Oder, Vistula, and Memel, present singular inland sheets of water, in the German language called *Haffs;* that of the Oder being styled Grass Haff; that of the Vistula, Frisch Haff (with another inland creek called the lake of Drausen); and that of the Memel, Curisch Haff. The Frisch Haff is about seventy miles in length, and from three to ten miles broad, being separated from the Baltic by a long slip of land, said to have been thrown up by the tempests and waves about the year 1190. This lake or bay is of small depth, and will not admit vessels of much burden.*

CURISCH HAFF. The Curisch Haff, so called from its situation in the ancient duchy of Courland, is about sixty British miles in length, and about thirty in its greatest breadth. A similar ridge of land divides it from the Baltic; and it is full of dangerous shelves, and infested by frequent storms.

MOUNTAINS. Magdeburg, Brandenburg, Pomerania, Prussia, and Poland, are in general level countries; and the only mountains in the Prussian dominions are those of Silesia. The mountains in the south and west of this province, may be regarded as a northern branch of the Carpathian chain, which itself forms the most southern boundary. This branch extends from Jablunka south-east to Friedberg in Upper Lusatia, north-west, near 200 British miles in length, and is called Sudetische Gebirge, or the Sudetic mountains; but has also more minute appellations, the north-west part towards Lusatia being called Riesen, the middle part the Bohemian, and the south-east, the Moravian chain. Of this remarkable chain, which has escaped the attention of most geographers, and drawers of maps, the highest peak in the mountains of Riesen, or of the giants, is the Schneekoppe, or snow head, in the Bohemian part, the Eule, or Owl, and the Zotenberg. The Moravian ridge divides into inferior branches, one of which forms a northern boundary of the principality of Troppau. In the north-western parts of Silesia are also detached mountains of considerable height,† as the Spitzberg, and Gratzberg, the Ruheberg, the Georgenberg, and the Reichenbach. Of these mountains the precise height seems not to be ascertained, yet they may safely be concluded to yield greatly to the Carpathian chain, an account of which will be found in the description of the Austrian dominions.‡

FORESTS. Few parts of the Prussian kingdom are destitute of woods and forests, which particularly abound in Prussia proper, and

* Busching, iii. 10. † Ibid. vi. 214.

‡ Buching, vi. 283, informs us that the Zottenberg, between Schweidnitz and Breslaw, is a celebrated mountain supposed to be the Asciburgius of Ptolemy; which, however, rather seems to be the ridge of Erzgeberg. The height has been computed at 2120 Rhenish feet. On the south it is connected with the Sudetic chain, but on all other parts is surrounded by a vast plain, and is supposed to derive its name from the neighbouring village of Zobten. This mountain consists entirely of serpentine with some hornblende. Kirwan, Geol. Ess. 204.

Fabri computes the highest peak of the Riesen at 4930 Rhenish feet above the sea, and the Zottenberg at 1700. The Silesian mountains, he adds, yield some silver, tin, copper, and cobalt, with considerable quantities of calamine, lead, and iron: and there are quarries of marble, free-stone, alabaster, slate, and potters clay. Coal abounds near Schweidnitz.

in the recent polish acquisitions. Towards Hungary, Silesia presents a continuation of thick forests, which conspire with the elevated mountains to form an impenetrable barrier.

Botany. The indigenous vegetables of the Prussian dominions have hitherto been viewed in only a very cursory manner. Among these there do not seem to be any which have not already been sufficiently noticed in the preceding accounts of Britain and Austria. The mountainous ridges of Prussia being few, and of little importance, there is, in consequence, a great deficiency of Alpine plants, the prevailing vegetables being those that inhabit level and sandy districts: the few following ones are all that it seems necessary to notice consistently with our general plan. Calla palustris; asarum europæum, *asarabacca;* iris Sibirica, *Siberian iris;* lilium bulbiferum and martagon, *orange* and *martagon lilies;* laserpitium latifolium, *laserwort;* and nicotiania tabacum, *tobacco;* this plant, originally a native of America, and probably also of the east, having been long cultivated in Prussia, has at length established itself in the soil, and is found in the ploughed fields, and hedges as a common weed.

Zoology. The breeds of horses and cattle, seem not to have impressed travellers with any distinction from those of the adjacent countries; and few parts are calculated for excellent breeds of sheep. The urus, or large and ferocious wild cattle of Lithuania, have also appeared in Prussia proper, but the race seems nearly extinct. One of its chief haunts was the forest of Masovia not far from Warsaw. The marmot, and a species of castor, may also be classed among the wild animals; and among the more ferocious the lynx, an animal of the colder climates, about the size of a fox, but the face and motions rather resemble those of the cat. Nor are these regions unvisited by the bear and the elk. The Oder sometimes affords sturgeon of a large size.

Mineralogy. The mineralogy of the Prussian dominions will not afford an extensive theme. Sand and plains rarely contain minerals, and even the mountains of Silesia boast of few hidden treasures. Yet in the southern districts of that province, there were formerly mines of gold and silver, but the produce did not defray the expense, though in the time of Busching two or three of the latter metal continued to employ some labourers. Mines of copper and lead however still exist, and there are considerable foundries of iron. In the mines of Silesia is found abundance of chrysoprase, which has been detected in various stages of transition, and appears to be a semi-opal deriving its green tincture from nickel. Agates, jaspers, and clear crystals of quartz, vulgarly called diamonds, are also found in the Silesian mountains. Coal, a more useful mineral, occur in various parts of Silesia, and the level districts sometimes offer good peat moors.

Amber. But the most distinguished and peculiar mineral production of Prussia is amber, which is chiefly found on the Samland shore of the Baltic, near Pillau, on a neck of land formed by the Frisch Haff, which seems to have been the chief seat of this mineral from the earliest ages. Amber is allowed by the best mineralogists, to be decidedly of vegetable origin, but mineralized by some operation

of nature, similar to that by which animal flesh is converted into a substance resembling spermaceti.* It is found at the depth of about 100 feet reposing on wood coal, in lumps of various sizes, some five pounds in weight, and is often washed on shore by tempests. By friction it becomes electric, and has imparted its Greek name to the modern philosophy and doctrines of electricity. It adds about 5000*l.* yearly to the royal revenue.

MINERAL WATERS. Silesia presents one spring of hot water at Warmbrun, near Hirschberg, which is, as is believed, the only mineral water worth notice, in the Prussian dominions.

NATURAL CURIOSITIES. The Sudetic chain of mountains has been little explored, and the level parts of the Prussian dominions can, of course, afford few objects of natural curiosity, if we except the mines of amber above-mentioned.

* Kirwan, ii. 66.

SPAIN.

CHAPTER I.

HISTORICAL GEOGRAPHY.

NAMES.—EXTENT.—BOUNDARIES.—ORIGINAL POPULATION.—PROGRESSIVE GEOGRAPHY.—HISTORICAL EPOCHS AND ANTIQUITIES.

NAMES. THOUGH Spain appear to have been known to the Phœnicians, near 1000 years before the birth of Christ, and their Tarsish to have been the little isle of Tartessus, near Gades, yet it seems hardly to have been disclosed to the Greeks in the time of Herodotus. It is probable that the whole country was the Tarsish of the Phœnicians and Hebrews; though the learned Huet rather restrict it to Betica, or the southern part of Spain; which region was, as is well known, the Mexico of the Phœnicians, who from it imported large quantities of silver. When the Greeks established a colony at Marseilles, they must not long after have discovered the northern part of this fertile region: which, from the noble river Iberus, or Ebro, they called Iberia; and from its extreme situation in the west, it was also styled Hesperia. The Romans, probably from a native term, have fixed and handed down *Hispania*; which has been variously adapted to the idiom of modern languages.

EXTENT. Spain lies between the 36th and 44th degrees of north latitude; and its western extremity is about 9° in longitude, west from London. The greatest length west to east, is about 600 miles; the breadth north to south, more than 500; thus forming almost a compact square, (if we include Portugal in this general view of the country,) and surrounded on all sides by the sea, except where the

Pyrenean chain forms a grand natural barrier against France.* But as the present estimate must exclude Portugal, which is reserved for another article, it may be observed that the boundaries betwixt these two kingdoms depend on artificial conventions, and not on rivers or mountains, or other remarkable features of separation. Spain is supposed to contain about 148,000 square miles; which, estimating the population at 11,000,000, yield seventy-four persons to the mile square.

ORIGINAL POPULATION. The original population of Spain seems to have consisted of Celts, from Gaul, and of Moors, Mauretani, from Africa; but the latter, a more warlike race, expelled the former, and even passed into Aquitain, in France. After the German Gauls had colonized the south of modern France, where they were the Galli Braccati of antiquity, they began to make expeditions into Spain, where they seized the region to the north-east, and became the Celtiberi of classical geography. Hence the names of rivers and mountains in Spain, rarely display a Celtic origin, being often African, and unlike those to be found in other parts of Europe, though recorded many centuries before the arrival of the Mahometans; and often Gothic, though mentioned before the Gothic invasion, in the fifth century. It is probable that the African settlers were not a little assisted in the expulsion of the primeval Celts, by the Phœnicians, and afterwards by the Carthaginians, whence the latter maintained such sway in distant parts of this country. But the records of Punic history being lost, we must be contented to begin with the African colony; which was succeeded, probably, about one hundred and fifty years before the Christian era, by the incursions and settlement of the Celtiberi, and other Gaulic colonies, who were only styled Celts, as having passed from Celtic Gaul; for the names of places, and other strong indications, denote their Gothic origin.

Towards the east must be added large colonies of Carthaginians, and afterwards of Romans; for this country which rivalled Italy in soil and climate, invited an unusual number of the latter, and produced many classical authors. From its natural situation, Spain has derived a greater mixture of inhabitants than perhaps any other European country. In the fifth century it was conquered by the Vandals; but, being afterwards weakened by their settlements in Africa, they were subdued by the Visigoths, who founded the modern kingdom of Spain, and from whom the more ancient families still pretend to derive their origin. The Mahometan Moors having been expelled, they must not be considered in the estimate, though a few families may be of Arabian extract: and the modern Spaniards may be considered as descended from the African Iberians, the Celtiberians, or German Gauls, the Romans, and the Visigoths.

PROGRESSIVE GEOGRAPHY. The progressive geography of Spain, is also very various. Litt'e is known till the Roman conquest, when Spain was divided into three provinces, Tarraconensis, or the north-east half of Spain; Bætica, or Betica, in the south; and Lusitania on the west, extending from the river Duro, in modern Portugal, on the north,

* The river Bidasoa forms the west boundary, and near its mouth is the isle of Pheasants. Irum, near the Bidasoa, is the last town in Spain. Dillon, 133.

to the present boundary of that kingdom, on the south. After the subjection by the Visigoths, these divisions seem to have passed into oblivion: but the conquest by the Moors, established a new and important distinction in Spanish geography, that of Christian and Mahometan Spain; and which is in some measure blended with the topic next to be considered.

HISTORICAL EPOCHS. The chief historical epochs of Spain are:

1. The original population by the Africans, and German Gauls.
2. The Carthaginian acquisitions in Spain.
3. The conquest by the Romans, who maintained possession for more than five centuries.
4. The subjection of Spain to the Vandals, about the year 415.
5. The conquest of Spain by the Visigoths under Euric, excepting Galicia, held by the Suevi, who had entered with the Vandals. The Galicians have to this day a distinct character of superior industry. In Euric, A. D. 472, commences the modern kingdom, and history of Spain. The Visigoths were Arians.
6. The conquest by the Arabs, or Moors, which began A. D. 709, and soon extended over all Spain, except the mountains of Asturias, where king Pelagius maintained a confined domination over that district, and Biscay. His descendants fixed the royal residence at Oviedo, built in 761, and not only defended their small territory, which was naturally fortified with chains of mountains, but soon regained Galicia, and part of Leon and Castile. In 914, as the territory extended towards the south, the kings began to reside at Leon, and thence derived their title; to which, in the eleventh century, was added that of Castile. But the Moors must be regarded as the chief possessors of Spain, till the middle of the thirteenth century.
7. The Moorish domination in Spain, which was conducted by governors appointed by the Chalifs till A. D. 756, when Abdoulrahman seized the sceptre of Spain, and became the Moorish king of Cordova, and first Chalif in the west. His successors continued to display great wealth and power; and under their sway the commerce of Spain became very extensive.* This dynasty continued till A. D. 1038, when the Spanish Chalifate expired, and the Moorish governors of several provinces usurped the royal style, in Cordova, Seville, Valentia, and Granada; who nevertheless rivalled the small Christian kingdoms till the middle of the thirteenth century, when, as already mentioned, the latter became preponderant, and Spain resumed her situation among the states of Christendom.
8. The kingdoms of Castile and Leon sometimes fell to distinct heirs; and the historical confusion is increased by the small kingdom of Navarre, the capital of which was Pampelona, a royalty which commenced A. D. 857: by that of Arragon, A. D. 1035: and other subdivisions.
9. The reign of Alphonso the Wise, which began A. D. 1252; and which rivalled those of the Spanish Chalif's in the protection afforded to the arts and sciences.

* Hist. de L'Afriq. et de L'Esp. sous la Domination des Arabes, par M. Cardonne. Paris 1765. 3 vols. 12mo.

10. The conquest of the kingdom of Granada, the last of the Moorish royalties; and the junction of the important crowns of Castile and Arragon, in the persons of Ferdinand and Isabella.

11. The reign of Charles V, son of Philip of Austria, who married the heiress of Arragon and Castile, and established the Spanish monarchy on its present basis. The wealth of America, discovered in the reign of Ferdinand and Isabella, now began to impart exuberant supplies, and the power of Spain arrived at its zenith.

12. Acquisition of Portugal by Philip II, A. D. 1580.

13. The revolt of Portugal under Philip IV. A. D. 1640; which has since existed as a separate kingdom, after having been subject to the Spaniards for sixty years.

14. The termination of the Austrian Dynasty, by the death of Charles II, Nov. 1, 1700: and the accession of the house of Bourbon, since which no epoch of singular consequence has arisen.

ANTIQUITIES. Of the first of these epochs it can hardly be supposed that any remains should exist, except a few tumuli, and other rude monuments. Nor are there any certain relics of the Carthaginians in Spain, except coins, which have been found in considerable numbers.

The Roman antiquities are, on the contrary, so numerous, that to enter into details on the subject would be prolix, and foreign to the nature of this work. The aqueduct at Segovia is one of the noblest of the Roman edifices.* It consists of 159 arches, extending about 740 yards; and is rather more than ninety-four feet in height, where it crosses the valley. Morviedo, the ancient Saguntum, presents many curious remains of antiquity. The theatre is capable of receiving near 10,000 people, and is hewn out of the solid rock; a labour not so great as might be imagined, as the Spanish rocks are generally gypseous, or calcareous. Tarragona, the ancient Tarraco, and capital of two thirds of Spain, also contains many curious monuments. In short the traveller will find abundance of Roman remains spread over this delightful country.

The Visigothic kings have left few relics, except their coins, which are struck in gold; a metal then unknown to the other European mints, and seemingly native. The churches, &c. of that period were probably destroyed by the Moorish conquest.

Numerous and splendid are the monuments of the Moors, in Spain. The mosque at Cordova was begun by Abdoulrahman, the first Chalif. The second Chalif of that name reared the walls of Seville. But these princes were far exceeded in magnificence by Abdoulrahman III, who built a town three miles from Cordova, which he called Zehra, after the name of one of his female favourites; and ordered a palace to be constructed by the most skilful architects of Constantinople, then the chief abode of the arts and sciences (A. D. 950).† In this palace were reckoned 1014 columns of African and Spanish marbles; while Italy had supplied nineteen, and the Greek emperor had transmitted one hundred and forty, of surprising beauty. The hall was decorated with marble, and massy gold; and in the midst of the ceiling was hung the

* Townsend, vol. ii. p. 115. † Cardonne, ubi supra.

famous pearl which the Emperor Leo had sent to the Chalif. The expense of Zehra, the palace, and gardens, was computed at 300,000 dinars of gold annually, for twenty-five years, or about 2,500,000*l*. The mines of gold and silver, then wrought in Spain, conspired with extensive commerce to afford an ample revenue. Yet on the death of this magnificent prince, a paper was found in his hand-writing, declaring that, during a prosperous reign of fifty years, he had only enjoyed fourteen days that were uniformly pleasant and agreeable. The mosque at Cordova still surprises travellers with the multitude of columns, which are computed at 800; but the palace of Zehra appears to have been annihilated in the barbarous and fanatic wars of the middle ages: and Granada, the last Moorish kingdom, having been subdued after the arts and sciences began to revive, it is natural there to expect the best preserved remains of Moresque antiquity. Nor will their Alhambra disappoint this expectation, as the reader may judge from Mr. Swinburne's elegant drawings; but for the sake of brevity Mr. Townsend's description shall be preferred. "You enter first into an oblong court of one hundred and fifty feet by ninety, with a bason of water in the midst, of one hundred feet in length, encompassed by a flower border. At each end is a colonade. From hence you pass into the court of the lions, so called because the fountain in the middle is supported by thirteen lions. It is adorned with a colonade of 140 marble pillars. The royal bedchamber has two alcoves, adorned with columns, and a fountain between them, in the middle of the room. Adjoining to this are two hot baths. The great hall is about forty feet square, and sixty in height, with eight windows and two doors, all in deep recesses. Between this and the oblong court is a gallery of ninety feet by sixteen. All these lower apartments have fountains, and are paved either with tiles or marble, in checkers. The idea of the ceilings is evidently taken from *stalactites*, or drop-stones, found in the roofs of natural caverns. The ornaments of the friezes are Arabesque, and perfectly accord with the Arabic inscriptions, which are here suited to the purpose for which each apartment was designed." Above is a suit of elegant apartments for the winter. This edifice was finished A. D. 1336.

The Christian antiquities of the middle ages consist of numerous churches, castles, and monasteries, as usual in other European countries.

CHAPTER II.

POLITICAL GEOGRAPHY.

RELIGION.—ECCLESIASTIC GEOGRAPHY.—GOVERNMENT.—LAWS.—POPULATION.—COLONIES.—ARMY.—NAVY.—REVENUES.—POLITICAL IMPORTANCE AND RELATIONS.

RELIGION. THE religion of Spain is the Roman Catholic, which in this country and Portugal has been carried to a pitch of fanaticism unknown to the Italian states, or even in the papal territory. The inquisition has, in these unhappy kingdoms, been invested with exorbitant power, and has produced the most ruinous effects, having been formerly conducted with a spirit totally the reverse of the mildness and charity of christianity. This evil has been recently subdued in a considerable degree; but one fanatic reign would suffice to revive it. A yet greater evil, which has sprung from fanaticism, is the destruction of morals; for the monks being extremely numerous, and human passions ever the same, those ascetics atone for the want of marriage by the practice of adultery; and the husbands from dread of the inquisition are constrained to connive at this enormous abuse. The conscience is seared by the practice of absolution; and the mind becomes reconciled to the strangest of all phenomena, theoretic piety and practical vice, united in bonds almost indissoluble.

ECCLESIASTIC GEOGRAPHY. According to the returns made to the government, the Spanish clergy stand as follow:*

Parochial clergy, called curas	16,689
Assistants, called tenientes curas	5,771
Sacristans or sextons	10,873
Acolitos, to assist at the altar	5,503
Ordinados de patrimonio, having a patrimony of three reals a day	13,244
Ordinados de menores, with inferior ecclesiastical orders	10,774
Beneficiados, or canons of cathedrals, and other beneficiaries	23,692
Monks	61,617
Nuns	32,500
Beatas	1,130
Syndics, to collect for the mendicants	4,127
Inquisitors	2,705
	188,626

* Townsend, ii. 213.

The archbishopricks are eight; bishopricks forty-six. The most opulent see is that of Toledo, which is supposed to yield annually about 90,000*l.** The Mozarabic Missal, composed by St. Isidore for the Gothic church, after the conversion from Arianism to the Catholic faith, continued to be used in Spain till the Moors were subdued, when the Roman form was introduced.

GOVERNMENT. The government of Spain is well known to be despotic, the States or Cortes having hardly been assembled since the time of Charles V. Dr. Robertson's history of that reign may be consulted for an able view of ancient Spanish liberty. If the late monarchs had been as much addicted to mass as to the chace, it is probable that the inquisition would have become the chief power in Spain. The despotism of the monarchy, which might in the hands of an able and intelligent prince be attended with great benefit to the nation, by the instantaneous extinction of abuses, is here balanced by the power of the church, to which even the nobles are submissive devotees. It is tempered, as usual even under oriental despotism, by many councils, who are responsible for any unwise or unsuccessful measures; for power is intimately connected with capacity, and when despotism is arraigned, there is often more cause to lament the mere indolence of the despot, who, instead of exerting his power for the general benefit, commits it to others for their peculiar advantage. The chief councils in Spain are: 1. That of dispatches, called also the junto or cabinet council, being composed of the king and his ministers of state. 2. The council of state in which the king presides, and of which the archbishop of Toledo is always a member. 3. The royal council of finances, called the Hazienda. 4. The supreme council of war. 5. The supreme council of Castile. 6. The supreme council of Arragon. 7. The supreme council of the inquisition. 8. The royal council of the orders of knighthood. 9. The royal council of the Indies. 10. That of the Crusada, composed of a commissary general, a member of the council of Castile, and another of that of Arragon, who arrange the subsidies to be granted by the clergy, under the pretext of war against the infidels. The grandees of the kingdom, who were formerly styled the Rich Men, have several privileges; among which an important one in their eyes, is, that of wearing their hats in the royal presence, which is however never done except at the nod of the sovereign.

LAWS. The laws of Spain are contained in several ancient codes; and recourse is also had to the civil and canon law. The *Escrivanos* are numerous, and instead of explaining the codes, often impede the administration of justice. Mistaken mercy frequently retains criminals in long durance, so that when they are executed their offence is forgotten, and the example of punishment becomes inefficacious.

POPULATION. The population of this kingdom is computed at 11,000,000, or seventy-four to a square mile; while France yields 174, and England 169: nay the kingdom of Naples is computed at 201. This striking defect of population has deservedly excited attention; and a late intelligent traveller† has attempted to assign the reasons, among which may be numbered the expulsion of the Jews after the conquest of

* Townsend, i. 311. † Townsend, ii. 218.

Granada; that of the Moors by Philip III; the contagious fevers frequent in the southern provinces; the incessant intestine wars, for seven centuries carried on against the Moors; the emigrations to America; and the vast numbers of unmarried clergy and monks. Several other causes are enumerated, among which must not be forgotten the want of detached farms; the struggles with the Moors having instituted a rooted prejudice which induces the yeomanry to crowd in towns and villages, as if for mutual defence, instead of spreading over and enriching the whole face of the country.

In the year 1787, the population of Spain was thus arranged:*

Males unmarried	2,926,229
Females ditto	2,753,224
Married men	1,947,165
Married women	1,943,496
Widowers	235,778
Widows	462,258
	10,268,150

Exclusive of the clergy, who are above enumerated, the numbers of each rank were thus calculated:†

Men servants—Criados	280,092
Day labourers—Jomaleros	964,571
Peasants—Labradores	917,197
Artisans	270,989
Manufacturers	39,750
Merchants	34,339
Knights—Hidalgos	480,589

"Of these last, four hundred and one thousand and forty are in the provinces of the Austrias, Biscay, Burgos, Galicia, and Leon."

Thus in the most uncivilized regions gentlemen, or rather idle men, are always the most abundant; where the civilization advances they are supplanted by a much more useful and respectable race, the men of industry.

Colonies. After the immortal discoveries of Cristoval Colon, called by writers in Latin, Christopher Columbus, the Spanish colonies soon became numerous and extensive, in the West Indies, South America, and various isles in the Pacific Ocean. No nation, except the English, can in this respect rival Spain. But the superior advantages of England, in religious and political freedom, have soon replaced the population thus withdrawn; while to Spain the wound has been incurable, as the causes of depopulation have always increased: and foreigners will never seek an asylum where they are despised, and loaden with the chains of the inquisition, or the yet heavier bonds of ignorant pride and prejudice.

Army. The Spanish armies, instead of carrying terror even into the bravest countries of Europe, as they did two centuries ago, are now neither distinguished by number, nor by discipline; the royal trea-

* Townsend, vol. ii. 213. † Ibid. vol. ii. 214.

sury being so much impoverished, that a large force cannot be maintained. In peace it is computed at about 60,000: but in war the number might be swelled to a great amount, by a popular monarch, and an ample revenue.

NAVY. Of late Spain has paid considerable attention to her navy, which has, however, been crippled in the recent warfare with England. The ships of the line can scarcely now be computed at less than fifty.

REVENUES. The revenue of Spain may be calculated, as is believed, at five millions and a half, sterling money; so that each person pays ten shillings to government for protection. In France, under the old government, each person paid near twenty shillings; in England at present sixty shillings. For the nature of the taxes the tables published by Mr. Townsend may be consulted. The expenditure now equals, or exceeds the income; but the national debt is a mere trifle. The best judges of the subject infer that the colonies yield no direct revenue to Spain, it being consumed in the expenses of the government of those distant regions.

POLITICAL IMPORTANCE AND RELATIONS. The political importance and relations of Spain were formerly deeply impressed on most regions of the globe. But exhausted by idle wars of ambition or avarice, this fertile kingdom has become almost a cypher in European policy. Setting aside Portugal, which promises to be speedily united, the position of Spain secures her from any invasion, except on the side of France; and it becomes therefore the insuperable interest of this exhausted state to cultivate amity with her powerful neighbour, which must maintain an unavoidable and supreme ascendant, from geographic position and relative force. On the other hand the distance and importance of the Spanish colonies, render a war with England the greatest calamity that can befal, as that power, enjoying the unlimited dominion of the ocean, can inflict dreadful wounds on the commerce and colonies of Spain. Such seem to be the sole hinges of Spanish polity, though ancient fame, and connexions with the royal families of more potent states, secure some degree of deference to her councils and mediation.

CHAPTER III.

CIVIL GEOGRAPHY.

MANNERS AND CUSTOMS.—LANGUAGE.—LITERATURE.—EDUCATION.—UNIVERSITIES.—CITIES AND TOWNS.—EDIFICES.—ROADS.—INLAND NAVIGATION.—MANUFACTURES AND COMMERCE.

MANNERS AND CUSTOMS. IN speaking of the religion of Spain, one of the most striking of the national customs and manners has been already mentioned, namely, the common practice of adultery under the mask of religion. This disgrace, which is confined to the catholic system, is said to have been transplanted from Italy, where love and devotion are as warm as in Spain. But the Italian *cicisbei* are more commonly gentlemen; while in Spain they are monks and ecclesiastics; and the vice becomes flagrant beyond conception, as it is practised by those very men who ought to exhibit examples of pure morality. It may perhaps be asserted that the Roman catholic system in the south of Europe is the only superstition in the universe which has, at any period, necessitated the practice of vice; thus confirming the maxim, that the corruption of the purest and best system is always the worst. Were the father of their faith, St. James the apostle, again to visit Spain, he would certainly begin with preaching the christian practice, as if the very idea of christianity had perished; and his first duty would be to convert the ecclesiastics.

Exclusive of this vice, the Spanish character is highly respectable for integrity and a long train of virtues. Conscious of an upright and noble mind, the respect which a Spaniard would pay to those qualities in others, is often centered in himself, as he is intimately sensible that he possesses them. This self-respect is nearly allied to pride; but it is the pride of virtue, which certainly ought not to humble itself before vice and folly. From the same principle arises an excess of ceremony, at least as laudable as the opposite extreme of nudity and impertinence, to which some modern fanatic philosophers would reduce human nature, or in other words, brutalize the species. Temperance is a virtue which the Spaniard shares with other southern nations, for wine is so inflammatory in regions exposed to the heat of the sun, that, instead of an agreeable warmth and a flow of ideas, it would produce fever, misery, and madness. In these countries the body is so much exhausted by the influence of heat, that the siesta, or short sleep in the middle of the day, becomes a necessary resource of nature, and is by habit continued even in the winter.

The chief defect in the character of the Spanish nobility and gentry is, their aversion to agriculture and commerce. Instead of those beautiful villas, and opulent farms, which enrich the whole extent of England, the Spanish architecture is almost confined to the capital, and a few other cities and towns. The metropolis is, however, their chief element, by traditionary custom, which arose like others from necessary causes; as in former turbulent periods their presence at court was considered as the sole pledge they could give of their duty and affection to the monarch. Now that long authority, and multiplied distinctions, have elevated royal families far above any competition with the great nobles, it would be patriotic in the sovereign to order them to build detached villas, and to establish their chief residence in them; a maxim of prudence not unknown to James the first of England, who used to advise the great men not to haunt the court, but their own estates, where their money might be spent among the tenants who supported their opulence; adding a similitude, that a ship in a fleet at sea appeared nothing, but in a river became an object of great importance. Till this event take place, and till farm-houses are scattered over the kingdom, it will be absolutely impossible for agriculture to flourish in Spain. To import German colonies, as has been done in the Sierra Morena, is to begin at the wrong end, and to suppose that the poor can set an example to the rich. If, by any wise reversion of prejudices, idleness, in whatever class of men, could be branded as infamous, and the disgrace extended to opulent vagabonds, we might then be led to hope that some hundred thousand Hidalgos, or sons of something, should become the more laudable sons of their own works, and contribute by trade and agriculture to promote at once their own fortunes, and the public prosperity. An intimate connexion and intermixture of all ranks of men, and their mutual respect for each other, form a liberal source of the wealth and power of the British dominions; but Spain perhaps despises the example of heretics.

Since the accession of the house of Bourbon, a slight shade of French manners has been blended with the Spanish gravity. But fashions have here little sway; and the prohibition of slouched hats and long cloaks led to a serious insurrection. The prohibition was, however, continued, and is salutary, as this complete disguise occasioned many nauseous customs, and even frequent assassinations. All visits are understood to be paid to the mistress of the house, the extreme gallantry of the men having reduced them to cyphers. When the Spanish ladies go to mass, which is almost the sole occasion of their being seen abroad, they attire themselves in a black silk petticoat, and a kind of mantle, which also serves as a veil, and is often arranged with singular ease and grace. The houses of the great are not disposed with the most elegant and commodious architecture; but are so large that Mr. Townsend assigns four hundred bed-chambers to the Duke of Alba's palace, where all the superannuated servants, with their wives and children are lodged; their wages being computed at 1000*l.* sterling a month. The cottages and inns are, on the contrary, miserable: but the dress and manners of the lower classes vary much in different provinces; and for a living picture of them the reader may consult the immortal work of Cervantes.

The amusements of people of rank chiefly consist in dancing and cards, and the theatre is little frequented, perhaps because the plays and music do not correspond in excellence with the national refinement. The combats with bulls in the amphitheatres have justly been regarded as a striking feature of Spanish and Portuguese manners. That such spectacles tend to familiarise the people with bloodshed, seems an idle theory, unwarranted by facts. Modern Italy has no gladiators, but numerous assassins; ancient Rome had scarcely one assassin, but whole armies of gladiators. Hardly to the most weak and diseased fancy can theatrical representation present any idea connected with real life; and it seems of no moment to the national character whether bulls be killed by butchers or by champions. A French theorist infers, from the bloodshed in English tragedies, that the people are sanguinary; whereas the very reverse is the truth, and an English mob may destroy houses, but never sheds blood. Contrast this with the innocent tragedies of the French, and the sanguinary spirit of the populace, exhibited at such distant periods, and from such opposite causes. The chief actors in the bull feasts are the picadors, who are mounted on horseback and armed with lances, and the chulos on foot, who relieve and sustain the former; but the chief personage is the matador, who enters amidst the profound silence of the whole assembly, and cooly dispatches the furious animal by a blow where the spinal marrow joins the head. The death is bloodless and instantaneous, and deserves imitation, as humanity would wish to save pain to the animals slaughtered for food. Sometimes the bull is pierced in various parts with lances, to which squibs are fastened, which being set on fire, the maddened animal stands pawing the ground, while he draws in and exhales volumes of smoke: sometimes an American is introduced, who, after the manner of hunting the wild bull in his own country, throws a rope round the horns, and entangles the quadruped as in a net, then kills him with perfect safety.

LANGUAGE. The Spanish language is one of the three great southern dialects which spring from the Roman; but many of the words become difficult to the French or Italian student, because they are derived from the Arabic, used by the Moors, who for seven centuries held dominion in this country. The speech is grave, sonorous, and of exquisite melody, containing much of the slow and formal manner of the Orientals, who seem sensible that the power of speech is a privilege.

LITERATURE. The literature of Spain is highly respectable, though little known to the other countries of Europe since the decline of Spanish power. The Bibliotheca Hispanica of Antonio will completely satisfy the curious reader on this subject. Among the fathers of literature in this country must be named Isidore of Seville, many of whose works are extant, and inferior in merit to few of that epoch. Lives of saints and chronicles are also found, as usual, among the earliest productions; and successive writers may be traced to the eleventh century, when they become numerous; but before briefly mentioning some Spanish authors posterior to that period, it will be proper to recollect that Arabian learning flourished under the Chalifs of Cordova, and produced many illustrious names well known to the Oriental scholar, as Aben Roe, or Averroes, Aben Zoar, Rhazes, &c.; nor must it be

forgotten that Aben Nazan wrote a book on the learning and authors of Spain. On this subject the inquisitive are referred to the work of Casiri. Many Jewish authors also flourished in this country.

In the eleventh century, as already mentioned, the Spanish authors began to increase in number, and the native language begins to appear. This was the epoch of the famous *Cid*, an Arabic term implying *lord*, Roderic Didac de Bivar, whose illustrious actions against the Moors were celebrated in contemporary songs, and by a long poem, written in the succeeding century; which also boasts of many chronicles and much sacred biography. After the thirteenth century, it would be idle to attempt to enumerate the crowd of Spanish authors, among which are Alphonso the wise, who wrote the *Libro del Tesoro*, a treatise on the three parts of philosophy, rational, physical, and moral; and at whose command were compiled the famous Alphonsine tables of astronomy. Raymond Lully is said to have written no less than 319 books: they are full of metaphysical froth, and one book of real knowledge would outweigh the whole. In the fifteenth century appeared Juan de Mena, a poet of surprising powers, and who unites the merits of Dante and Petrarca. Since the year 1500 scarcely can a department of literature be mentioned, in which the Spaniards have not excelled; if we except natural philosophy, the progress of which has been checked by the inquisition. It would be unnecessary to repeat the well known names of Cervantes, Quevedo, Lopez de Vega, or other authors whose works are known to all Europe. The history of Mexico, by De Solis, has been celebrated as a composition; but in facts it is defective and erroneous. The name of Bayer, in learning, and of Feyjoo, in general knowledge, have recently attracted deserved respect: nor has the line of royal authors failed, an elegant translation of Sallust having been published by the heir apparent to the monarchy.

Education. The rudiments of education in this country being chiefly imparted by the monks, it cannot be expected that useful knowledge should be common. But the recent accounts of Spain have thrown so little light on this topic, that it can only be generally understood by comparison with other catholic countries. It is, however, to be regretted, that intelligent travellers have not lent more attention to this subject, more important in its consequences than any form of government: nor would it be unuseful to know that practised in Spain in particular, as the reverse must be excellent.

Universities. The universities, or rather academies, in Spain, are computed at upwards of twenty; of which the most noted is that of Salamanca, founded in the year 1200 by Alphonso IX, king of Leon, and afterwards regulated by Alphonso the wise. The students have, at former periods, been computed at 16,000, sufficient to darken the face of the earth; for the reign of Aristotle in logic and natural philosophy, and of Thomas Aquinas in theology, continues unviolated, so that a student of the year 1800, may aspire to as much ignorance, as one of the year 1300; and the progeny of dunces proceeds without end. In 1785, the number of students was computed at 1909*. The same antiquated teachers are received with implicit

* Townsend, ii. 79.

faith in the other universities, so that a more liberal education at school must here be obliterated.

CITIES AND TOWNS. As a proper introduction to a brief account of the chief cities and towns of Spain, the following estimate is subjoined from an accurate author*:

Cities—Ciudades	145
Borough towns—Villas	4,572
Villages—Lugones	12,732
Hamlets—Aldeas	1,058
Granjas—Farm houses	815
Cotos redondos—Parks or wastes inclosed	611
Depopulated towns	1,511
Parishes	18,972
Convents	8,932

MADRID. Madrid, the royal residence, while Seville is esteemed the capital of Spain, is of recent fame. Philip II, first established his court at Madrid; and the nobility, in consequence, erecting numerous palaces, this formerly obscure town began to assume an air of grandeur. The centrical position seems the chief advantage, for the environs can boast of little beauty or variety. The river Mançenares is in winter a torrent, but dry in summer: over it is an elegant bridge, which occasioned a sarcastic remark, that the bridge should be sold in order to purchase water. This metropolis contains thirteen parishes, 7398 houses, 32,745 families, amounting to a population of 147,543†. The convents are sixty-six; and there are fifteen gates of granite, many of which are elegant. The chief is the Puerta de Alcala, of three arches, the central being seventy feet in height. The churches and monasteries contain many noble paintings, and the royal palaces display considerable magnificence. The new palace presents four fronts, of 470 feet in length, and 100 in height, enriched with numerous pillars and pilasters. The foundation was laid in 1737, three years after the ancient palace had fallen a sacrifice to the flames. The audience chamber is deservedly admired, being a double cube of ninety feet, hung with crimson velvet, and adorned with a sumptuous canopy and painted ceiling. The prado is a spacious course, in which the great display their elegant equipages. At Madrid are the royal manufactures of china, saltpetre, &c.; but the city has little trade, and chiefly prospers by the presence of the court, and confluence of the great, whose rents are remitted to the capital, to the great injury of the kingdom at large.

Next in real importance to Madrid are the principal sea-ports, which are enriched by commerce; while the cities in the interior decline from the want of agriculture and inland navigation. The commerce of America formerly centered at Seville, but was afterwards removed to Cadiz, a city which is supposed to contain about 70,000 souls‡. The two cathedrals are grand; and there is an hospital which will contain 6000 patients. The hospicio, or general workhouse, is an interesting establishment, containing more than 800 poor of all ages, who are here trained to industry.

* Townsend, ii. 215. † Ibid. i 253. ‡ Ibid. ii. 374.

MALAGA. Malaga is esteemed the second port in the kingdom, and is also celebrated for excellent wines, the rich Malaga, the Mountain, so called from the hills which produce the grape, and the Tent or Tinto, so styled from its deep red tinge. Malaga stands in a valley surrounded with hills, the houses high, the streets narrow and dirty. Inhabitants about 40,000: the cathedral begun in 1528 is not yet finished; the convents are twenty-five, but of small account*. The city swarms with thieves and mendicants. The municipal government rests with a corregidor or mayor, appointed by the crown; but the regidors or aldermen are hereditary. There are also two syndicos, or tribunes to protect the people.

BARCELONA. Towards the south-east is the third most considerable port of Spain, that of Barcelona†. The streets are narrow and crooked; the churches rather rich than beautiful. The hospicio contains about 1400 industrious poor, and there is a house of correction which sometimes includes even women of rank, if guilty of drunkenness or other low vices. The inhabitants of Barcelona are computed at more than 100,000: and industry prevails here, being a native virtue of the Catalonians: chief manufactures, silk, cotton, and wool, excellent fire-arms and cutlery; the chief imports, corn, fish, and woolen goods; exports wine, brandy, cloth, and leather. During peace, it is supposed that 1000 vessels enter this port, of which half are Spanish, 120 French, 100 English, and 60 Danes. Barcelona stands in a plain open to the south-east, but protected by hills on the north and west, being a healthy and delightful residence; but the east wind commonly brings fog, and produces such irritability that the best friends at such periods, rather wish to avoid each other.

Along the northern shores of Spain there are few harbours of any note.

CORUNNA. The most remarkable is that of Corunna, by our mariners styled the Groyn. The harbour is large and safe; the town of a circular form; but the poverty of the surrounding province of Galicia affords few resources for trade, and many of the natives are dispersed over Spain and even Portugal, as day labourers and servants, being universally esteemed for their probity and fidelity.

The chief inland cities of Spain shall be briefly reviewed, beginning from the north. Oviedo and Leon are now inconsiderable, and only boast their ancient fame, as successive capitals of Spanish royalty, when struggling against the Moors. The cathedral at Leon is admired for its elegant lightness.

PAMPELONA. Pampelona, the capital of Navarre, is more remarkable for the learning of some of its prelates, than for any other circumstance. The inhabitants are about 5000. Burgos, the see of an archbishop, retains vestiges of former opulence. Valladolid, in the same province of Old Castile, contains some woolen manufactures, and many goldsmiths and jewellers.

SARAGOSSA. Saragossa, the chief town of Arragon, is the ancient Cæsarea Augusta, and displays many rich churches and convents‡. The university contains about 2000 students. There are

* Townsend, iii. 10. &c. † Ibid. i. 106. ‡ Ibid. i. 205.

no manufactures, though it is to be hoped that these will be encouraged by the great canal of Arragon, projected, like other Spanish works, on a most magnificent scale, and of the length of about 250 English miles, from the mouth of the Ebro to St. Ander in the western extremity of Biscay, thus uniting the Mediterranean with the Atlantic.

Toledo. On the south of Madrid first occurs Toledo, a city of considerable fame, and remarkable situation, for the river Tajo, or Tagus, passing between two mountains of granite, almost surrounds one of them, on which is placed the city, rising like a cone*. Toledo was formerly the royal residence; and contains a grand palace, built in the reign of Charles V. The manufacture of arms was long famous, and has been recently revived: the archbishoprick is computed at 90,000*l.* annually: but the inhabitants, once calculated at 200,000, are now reduced to 25,000.

Badajos. Badajos, in Estramadura, is remarkable for its position on the very confines of Portugal, and is the see of a bishoprick.

Seville. In the southern provinces appears Seville, famous till the year 1720, as the mart of American trade. The inhabitants are computed at 80,000; and the churches and convents are opulent and beautiful. The chief manufactures silk, and recently snuffs, a royal monopoly, not only the common Spanish, but rappee, as it was found that the latter was smuggled from France. The tobacco employs 220 manufacturers, who are strictly examined and guarded. Seville is esteemed the chief *city* of Spain, Madrid being only a *town* distinguished by the royal residence†.

Murcia. Murcia, the capital of the province so called, is of considerable account, and situated in one of the most beautiful vales in Spain‡. The inhabitants are computed at about 80,000, more probably, 60,000. There is a beautiful bridge over the Segura; and the cathedral is lofty, but cannot boast of internal opulence or beauty.

Granada. Granada has been long celebrated as the paradise of Spain, though the southern provinces be in general unhealthy. This city stands in a vale bounded by hills, beyond which, to the south, is the Sierra Nevada, so called because the mountains are covered with perpetual snow. The inhabitants supposed to be 80,000; the Moorish palace here has been already described; and adjoining is a palace erected by Charles V. The cathedral and convents contain excellent pictures by Spanish masters. The municipal government is in a corregidor and twenty-four regidors. There are beautiful public walks; and the environs are delightful and well cultivated||.

* Townsend, i. 303.

† Dillon, 432. But the population of Madrid and Barcelona is far superior.

‡ Townsend. iii. 150.

|| Gibraltar, so called from a Moorish or Arabic denomination, signifying the mountain of Tarik, who conducted the Moors into Spain, stands on the west side of a rocky mountain, called Calpe by the ancients: and to the west of the town is a large bay. In 1462 it was taken from the Moors; and in 1704 fell into the hands of the English. The siege during the American war is of fresh and celebrated memory. The inhabitants of the town are about 5000; and the garrison generally amounts to as many. The number and strength of the military works, and the vast galleries opened in the calcareous rock, excite admiration. There is a stalactitic cave, that of St. Michael; and

EDIFICES. The most remarkable edifices of Spain, are the cathedrals of the several sees, and the churches belonging to opulent convents. The houses of the nobility are confined, with few exceptions, to the capital and other cities, instead of adorning the country at large, as in England. This circumstance, however, tends, in Spain and Italy, to impress a stranger with erroneous ideas, concerning the abundance of works of art in these countries; while the seeming opulence arises in great part from their being concentrated in particular spots, instead of being diffused in distant villas. The palace and monastery of the Escurial, have been described at great length by many travellers. It is seated in a deep recess, at the foot of high mountains; and was built by that bigot Philip II, in the strange form of a gridiron, the instrument of the martyrdom of St. Lawrence, upon whose anniversary the Spaniards gained the victory of St. Quintin. The convent is 740 feet, by 580; and the palace forms the handle of this imaginary gridiron. The paintings are excellent and numerous; and the vault containing the royal tombs, is grand and impressive. But the palaces of Aranjuez and St. Ildefonso are greater favourites with the court. The gardens of the former, watered by the Tajo, are laid out in a just and natural taste. St. Ildefonso is a summer residence, exposed to the north, and being built on a rocky soil, is computed to have cost six millions and a half sterling. The Pardo, another palace, stands in the midst of a large forest.

Colonies proved the ruin of Athens; and the attention paid to foreign colonies is always detrimental to the parent state. This political axiom may most justly be applied to Spain, which has, in fact, been exhausted and impoverished, by grand and rich colonies. Hence the natural advantages of the country have been sacrificed to commercial speculations; and the miser starves amidst accumulated wealth.

INLAND NAVIGATION. The inland navigations of Spain, though commenced upon united principles of grandeur and utility, had been permitted to languish through the want of resources, and the slow measures of the court, rather than by any indolence of the superintendants and labourers. The great canal of Arragon seems to remain in a state of imperfection, though we are told that two branches are completed from the Ebro towards Navarre, and have been attended with the most beneficial consequences*. One of these canals is conducted over the valley of Riojalon, by an aqueduct bridge of 710 fathoms in length, but only seventeen feet thick, at the base. Another canal was to begin at Segovia, or about forty miles north of Madrid, thence to extend to the bay of Biscay. This is termed the canal of Castile. The canal of Guadarama was conducted with more spirit, and is probably completed. It was to open near the Escurial, and proceed south to the Tajo or Tagus; and another was projected from the capital to the same river. A canal was begun in Murcia, but so ill projected, that it was found to be impracticable.

bones are found in the rock, which seem to have fallen into the cavities, where they are enveloped in the exuding petrifaction. The fortress, in the opinion of most military men, is absolutely impregnable.

* Phillips, 65.

MANUFACTURES AND COMMERCE. The manufactures of Spain are considerably checked by the royal monopolies, which extend to the following articles*:

Broad cloth, at Guadalajara and Brihuega.
China, at the palace of the Buen Retiro.
Cards, at Madrid and Malaga.
Glass, at St. Ildefonso.
Paper, in Segovia,
Pottery, at Talavera.
Saltpetre, at Madrid and various other places.
Stockings, at Valdemoro.
Swords, at Toledo.
Tapestry, at Madrid.
Tissue, at Talavera.

The king has also the monopoly of brandy, gunpowder, deal, quicksilver, sealing wax, salt, sulphur, and tobacco. Most of the royal manufactures may be regarded as monopolies; no private capital being able to vie with the treasury. It is possible that the first intentions were laudable; to set an example to the nobility of the advantages of industry; but in this respect they have failed, and the consequences have added to the national distress. Many manufactures, are, however, conducted in Spain, with great spirit and assiduity: and any failure must not be imputed so much to the indolence of the people, as to the prejudices of the great, and the inquisitorial power of the ecclesiastics, which cramps genius and invention of all kinds, and constrains the mind to the same perpetual circle. Spain supplies wines, oil, fruits, silk, leather, broad cloth, and other articles to many European countries; but her chief trade is with her own colonies in America. The soil of Spain is exuberant in the production of saltpetre; and the barilla used in making glass, has been long celebrated. This species of potash is procured by burning several vegetables found on the shore of the Mediterranean near Carthagena†. The region which produces the greatest abundance extends about sixty leagues in length and eight in breadth. Spain is supposed to gain little or nothing by her intercourse with her colonies, for the gold and silver imported flows like water from the parent rock into the vales, naturally proceeding towards countries where labour is cheaper, and which supply Spain with necessaries in return for the precious metals.

In the year 1784, the exports from Spain to America were thus computed in pounds sterling‡:

	Spanish Produce.	Foreign Produce.	Total Produce.
Cadiz	1,438,912	2,182,531	3,621,443
Malaga	196,379	14,301	210,680
Seville	62,713	30,543	93,256
Barcelona	122,631	21,240	143,871
Corunna	64,575	39,962	104,537
Santander	36,715	90,173	126,888
Tortosa	7,669	289	7,958
Canaries	24,974	.....	24,974
Gijon	4,281	10,190	14,471
	£.1,958,849	£.2,389,229	£.4,348,078

* Townsend, ii. 240. † Ibid. iii. 131. ‡ Ibid. ii. 415.

The duties were computed at 170,800*l.*

The imports from America to Spain, were, at the same time, thus estimated in the same money:

	In Money and Jewels.	In Merchandise.
Cadiz	8,297,164	2,990,757
Malaga		18,605
Barcelona	102,140	91,233
Corunna	741,283	90,001
Santander	40,843	100,974
Canaries	109,807	52,366
	£.9,291,237	£.3,343,936

The whole imports, therefore, exceeded twelve millions and a half: the duty amounted to more than half a million.

CHAPTER IV.

NATURAL GEOGRAPHY.

CLIMATE AND SEASONS.—FACE OF THE COUNTRY.—SOIL AND AGRICULTURE.—RIVERS.—LAKES.—MOUNTAINS.—FORESTS.—BOTANY.—ZOOLOGY.—MINERALOGY.—MINERAL WATERS.—NATURAL CURIOSITIES.

CLIMATE AND SEASONS. THE climate of Spain has been deservedly praised, as equal if not superior to that of any country in Europe; but in the southern provinces, the heat is insalubrious, and malignant fevers sometimes sweep off great numbers. This disaster probably originates from the neglected state of the country, from stagnant marshes, which might, if properly drained, supply running streams and verdant meadows. The south-east wind from Africa, called Solano, has such inflammatory effects, that it is said, more murders are then committed during three days, than throughout the rest of the year*. The chains of mountains which pervade Spain at different intervals from east to west, seem to temper the climate, and supply cooling breezes. In the south, the sea breeze, beginning about nine in the morning, and continuing till five in the evening, agreeably diversifies the warmth of the summer; and in the northern provinces, the severity of winter is allayed by the proximity of the ocean, which generally supplies gales, rather humid than frosty.

FACE OF THE COUNTRY. The face of the country is, in most seasons, delightful, abounding with excellent and fragrant pasturage, vineyards, and groves of orange trees; and the hills clothed with wild thyme, and other odorous plants. The rivers and streams are numerous; and the chains of mountains afford a grand variety to the prospect.

SOIL AND AGRICULTURE. The soil is generally light, and reposes on beds of gypsum or plaster of Paris, itself an excellent manure. "The common course of husbandry† about Barcelona begins with wheat; which, being ripe in June, is immediately succeeded by Indian corn, hemp, millet, cabbage, kidney beans, or lettuce. The second year these same crops succeed each other as before. The next year they take barley, beans, or vetches; which, coming off the ground before midsummer, are followed, as in the former years, by other

* Dillon, 308. Townsend, &c. † Townsend, i. 179.

crops, only changing them according to the season, so as to have on the same spot the greatest possible variety." Wheat produces ten for one; but in rainy seasons fifteen. The same intelligent author informs us that near Carthagena the course is wheat, barley, and fallow.* For wheat they plough thrice, and sow from the middle of November to the beginning of December; in July they reap from ten to one hundred for one, as the season happens to be humid. The Huerta, or rich vale of Alicant, yields a perpetual succession of crops. Barley is sown in September, reaped in April; succeeded by maize, reaped in September; and by a mixed crop of esculents which follow. Wheat is sown in November, and reaped in June; flax in September, pulled in May. In the vale of Valencia, wheat yields from twenty to forty; barley from eighteen to twenty-four; oats from twenty to thirty; maize one hundred; rice forty. In the more southern provinces the land is almost equally fertile; and the sugar-cane is cultivated with success near Granada. The Spanish plough is generally light, and is drawn by oxen with the yoke over the horns; the most proper and natural mode, as the chief strength of the animal centres in the head. Agriculture is greatly impeded in Spain by the superior attention paid to the large flocks of sheep, which are authorised by a special code, the Mesta, to travel from one province to another, as the season presents pasturage in the vales, or on the mountains. The Merino sheep, or flocks thus privileged, are computed at 5,000,000; and one nobleman has sometimes 40,000. The fleece is esteemed double in value to that of other sheep: but the checks given to agriculture by such privileges, unknown to all other countries, are incalculable.

Rivers. Among the chief rivers of Spain may be named the Ebro, which anciently conferred an appellation on the country.

Ebro. This noble stream rises in the mountains of Asturias, in a small vale east of Reinosa, and pursuing its course to the south-east, enters the Mediterranean sea, after having run about 380 G. miles. The other rivers running to the east are of less importance, as the Guadalavir, the Xucar, and the Segura, which enlivens the fertile vales of Murcia.

Guadalquivir. Towards the west occurs the Guadalquivir, the ancient Bætis which gave name to the province. This river originates in the Sierra Morena, and flows into the gulf of Cadiz, after a course of near 300 G. miles. The Guadiana rises in the north side of the Sierra Morena, according to Spanish authors, though the chief sources seem rather to be in the mountains of Toledo: it pursues a part of its course through Portugal, and falls into the gulf of Cadiz, after a circuit nearly equal to that of the Ebro.

Tajo. But the chief river of Spain and Portugal is the Tajo, or Tagus, which rises on the west of Arragon, near Albarracin, in a spring called Abrega,† and holds a course of about 450 G. miles.

Douro. The Douro springs near the ruins of ancient Numantia; and its course may be computed at 350 G. miles.

*Townsend, iii 134.

† Near the Sierra Blanca, esteemed the highest situation in Spain, as the Guadalavir runs into the Mediterranean. Dillon, 208.

MINHO. The Minho rises in the mountains of Galicia; and is more remarkable as forming a part of the boundary between that province and Portugal, than for the length of its circuit, which does not exceed 160 G. miles. Many other streams pervade the northern provinces, but not of sufficient importance to be here commemorated.

LAKES. The lakes of Spain are so few, and of such small extent, that they scarcely deserve notice. There is a singular series of small lakes in the south-east of New Castile, to which some assign the source of the Guadiana.

MOUNTAINS. The Spanish mountains are arranged by nature in several distinct chains. The most northern is regarded as a continuation of the Pyrenees, passing on the south of Biscay and the Asturias into Galicia. This chain is distinguished by different names, as the mountains of Biscay, the Sierra of Asturias, and the mountains of Mondonedo in Galicia. It is also known by the names of the mountains of Santiliana, of Vindo, and of the mountains of Oca.* If we except the Alps, Pyrenees, Apennines, and other chains in countries civilized at an early period, and accustomed to general and scientific views, there is scarcely a range of mountains distinguished by an uniform term, though so necessary in geographic elucidation. It must also be here observed that the term *Sierra*, peculiar to Spain, implies a chain of mountains whose successive peaks present the resemblance of a *saw*. The gypseous and argillaceous mountains of this country rarely exhibiting any supreme elevation, like those in the granitic chains, naturally suggested this singular appellation.

The second chain of Spanish mountains extends from near Soria on the north-east, and pursues a south-west direction towards Portugal. This chain is called that of Urbia, or Guadarama; and also the *Montes Carpentanos*.† The third is that of Toledo, running nearly parallel with the last. These two central chains seem to contain great quantities of granite.

Next towards the south, is the Sierra Morena, or Brown Mountains; which are followed by the most southern ridge, that of the Sierra Nevada.

On the east there is a considerable chain, which connects the two central ridges, and advances towards the Mediterranean in the north of Valencia. There are also several considerable ranges of hills in this part of the kingdom, generally running from north to south.

MONTSERRAT. A remarkable solitary mountain, not far from Barcelona, must not be omitted. At a distance Montserrat appears like a sugar-loaf; but on a nearer approach seems jagged like a saw, with pyramidal rocks: it is composed of farcilite or pudding stone, formed of lime-stone gravel united by calcareous cement; and is of such a height that from its summit may be discerned the islands of Majorca and Minorca, at the distance of fifty leagues.‡ The circumjacent region is of argillaceous schistus, with clay and sand. As the Pyrenees are chiefly calcareous, the pebbles, even to a remote distance, are of the

* Journal des Mines, An. v. 391.

† Dillon, p. 115, says the mountains, dividing the two Castiles, are called those of Guadarama.

‡ Towns. i. 189.

same nature; and this hill seems to have originated in some unaccountable manner, from materials swept down by primeval waters from the Pyrenees; as those near Oban, in Scotland, from the granitic chain in that country: the only difference being that of the materials, which compose the farcilite, in the one instance calcareous, and in the other siliceous. Not far from Montserrat, near the village of Cardona, is a hill three miles in circumference, which is one mass of rock salt; used in the dry climate of Spain for vases, snuff boxes, and trinkets, like our Derbyshire spar.

Pyrenees. The Spanish side of the Pyrenees has not been accurately examined; and as the French mineralogists have amply illustrated the part belonging to France, an account of these mountains has been given in the description of that country. In the want of a general and scientific account of the Spanish mountains, a few notices must suffice, extracted from different parts of Mr. Townsend's travels. According to that intelligent observer the northern side of the Pyrenees is chiefly calcareous, surmounted with argillaceous schistus; but the southern is granite, and of course barren.* The hills to the south of Gerona are also granitic. The highest ridge in Spain, near Daroca, whence originate the Tajo and the Ebro, seems composed of argillaceous schistus, and free-stone, probably resting on granite.† Near Anchuela the mountains are lime-stone with shells; and sometimes contain beds of red gypsum with crystals of the same colour. In general, gypsum is as abundant in Spain, as chalk is in England; and the gypsum produces crystals of sea salt and Epsom salt, and abundance of nitre. The mountains on the north of Madrid, forming part of the central chain, are granite.‡ Those to the north of Leon chiefly marble, or lime-stone, on a basis of argillaceous schistus, rising in bold and rugged rocks, which afforded a barrier to the remains of Spanish liberty. In returning towards the south the soil of La Mancha is sandy, the rock gypsum. The higher regions of the Sierra Morena are granite; the lower argillaceous schistus, with gypsum and limestone. The granite is of two kinds, the red and the white.|| Near Cordova the highest hills are covered with rounded masses of granite, grit and lime-stone. Near Malaga are branches of the Sierra Nevada, or snowy chain, an appellation which might also be extended to the central range between Old and New Castile, which according to Mr. Townsend, might at some times be visible at the distance of 100 miles: these branches present lime-stone and marble, surmounted by argillaceous schistus. Near Alhama south-east of the city of Granada, are found rocks, which on a basis of shingle or round gravel, present sand-stone with shells, surmounted with farcilite; but in general the rocks are gypseous, with strata of the same substance, crystallized. Mr. Townsend** supposes that the power of the sun contributes to impregnate chalk with vitriolic acid, thus forming gypsum. The south-east part of Spain seems equally calcareous, and the cathedral of Murcia is built with pisolite, a sort of freestone resembling the roe of fish. But near Cape de Gata the hills must be granitic, as a kind of aventurine, brought from that district, demonstrates.

* Towns. i. 89. † i. 219. ‡ i. 356. ii. 107. || ii. 290. 297. ** iii. 49. 52.

FORESTS. Spain contains many forests, partly arising from the want of cultivation, partly reserved for the royal pleasures of the chace; as that of the Pardo, which extends near thirty miles in length; some of the forests are haunted by smugglers, and banditti, who raise contributions from the unwary travellers, and even murders are not unfrequent.

BOTANY. Although the great promontory west of the Pyrenean mountains is divided, by its political interests, into the independent governments of Spain and Portugal, yet the distribution of the different kinds of soil, and natural products, is so little conformable to the territorial division, that an account of the botany of either country must necessarily include the great outlines of the other: it will therefore save much repetition, to unite the two kingdoms in a general sketch of the botany of the whole promontory.

Spain, including by this term the whole country west of the Pyrenees, may be divided, according to its botany, into the sea-shore; the high mountains; the lower ones; the arable lands; the grazing tracts and marshes along the rivers; and the vicinity of Lisbon and Oporto.

The sea-shore of Spain presents fewer peculiarities than the interior; resembling for the most part in its vegetable productions the northern coasts of the Mediterranean: the flat sandy tracts are occupied by the pancratium maritimum, *sea daffodil;* festuca maritima, and elymus caput medusæ, two coarse kinds of grass; salicornia fruticosa, *shrubby glasswort*, and salsola soda and sativa; of the last of these there are extensive plantations in the neighbourhood of Alicant and Barcelona, for the purpose of procuring from its ashes the Spanish barilla, an alkaline salt of considerable purity, of which some thousand tons are every year manufactured, partly for foreign commerce, and partly for the preparation of the fine Spanish soap. The rocks on the coast are chiefly calcareous, and abound with crithmum maritimum, *samphire;* viola arborescens, *tree violet;* astragalus tragacantha, *tragacanth vetch;* the majestic antirrhinum Lusitanicum; capparis spinosa, *caper bush;* and stipa tenacissima, the celebrated esparto grass, which, on account of its extraordinary toughness, is used for making ropes, mats, chair-bottoms, and, in short, all the articles included under the French term *sparterie.*

The high mountains of Spain being neither so lofty, nor in such large masses as those of Swisserland, are covered with snow only for a few weeks in the year; here therefore, and in the lower mountainous ridges that border the bay of Biscay, we find a number of plants familiar to the plains of the north of Europe; the finest timber trees in Spain are found in these elevated regions, and the English botanist might here almost think himself in his native country; the common oak, the lime, the birch, the mountain ash, the yew, the beech, the larch, the holly, and the juniper, grow to a considerable size; of the smaller shrubs and herbaceous plants, the principal are arbutus uva ursi, *bear-berry;* minuartia montana; asperula Pyrenaica; eryngium Alpinum; arenaria triflora; draba aizoides, and Pyrenaica; saxifraga cuneifolia and bryoides; rhododendron ferrugineum; alyssum montanum, *mountain alyssum*, and empetrum album, *white crow-berry.*

The long ranges of moderate sized hills that occupy the greatest part of Spain, consist either of extensive arid tracts of sand, of arenaceous sand-stone, and ferruginous rubble forming the heaths; of dry calcareous districts forming the sheep-walks; or of moist rough granitic and marble ridges, with but a shallow soil forming the woodlands.

The Spanish heaths are gayer and richer with plants than those of any other European country; in some parts are thick woods of the *yew-leaved fir* and *stone pine*, in others are scattered groves of *cork trees*, quercus suber; here the traveller is regaled with the fragrance of numberless aromatic plants, the thymus mastichina, *mastich thyme;* lavandula spica, and stæchas, *spike lavender;* melissa nepeta; origanum heracleoticum; teucrium iva, spinosum, and Lusitanicum; salvia officinalis, and Hispanica, *common* and *Spanish sage;* and rosmarinus officinalis, *rosemary;* the golden blossoms of the *gorse*, ulex Europæus, a plant chiefly found in England and Spain, and the crimson, flesh-coloured, and snowy flowers of the arborescent *heaths*, erica umbellata, arborea, purpurascens, scoparia, vagans, australis, &c. mutually heighten each other; now the stately growth of the juniperus oxycedrus, or phœnicea, attracts attention, then the eye turns with delight to the humble dianthus caryophyllus, *clove July-flower*, glowing by its side; the elegant lithospermum fruticosum entangles itself among thickets of dwarf-myrtle, and every spot of sand or dry rock, forsaken by other vegetables, is adorned and perfumed by the cistus; of this plant there are no less than fourteen species natives of Spain, all of them eminently beautiful for their broad silken blossoms of pure white or yellow with deep crimson eyes: the *laurel-leaved cistus*, C. laurifolius, is most frequent in Old Castile, but the commonest of all is the cistus ladaniferus, *gum cistus*, a most elegant and fragrant shrub from six to seven feet high, which occupies whole miles of dry rock, and on this account forms a very peculiar feature in the scenery of Spain.

The sheep-walks are for the most part open downs with little shelter, except here and there a grove of chesnut trees, or evergreen oaks, quercus ilex; the turf differs essentially from that of the English sheep-walks in containing very few species of grass, being chiefly composed of the smaller papilionaceous plants. Dactylis cynosuroides, aira minuta, cynosurus lima, and aureus, festuca calycina, and lygeum spartum are the most frequent of the grasses; the other vegetable inhabitants of these uplands are scabiosa stellata, galega officinalis, anthyllis lotoides, and erinacea, cucubalus bacciferus, *berry-bearing campion;* and psoralea bituminosa.

The woodlands of Spain demand particular notice, in an account of its vegetable productions; we find here none of that noon-day night of shade that spreads such an awful solemnity over the recesses of the German and English forests, the trees are neither so large nor is their foilage so ample; several of the calcareous summits are covered with chesnut trees and box, but the great mass of the woods consists of the *evergreen sweet oak*, quercus bellote; this tree is about the size of a large pear tree, which it somewhat resembles in its manner of growth; its leaves are lanceolate, green above and hoary beneath, curled and rather scanty; it produces large crops of sweet acorns which are extensively applied to the fattening of hogs, and the nourishment of the

peasants: intermixed with these are the wild olive, the kermes oak, walnut, and carob tree (ceratonia siliqua); the almond fixes itself in the crevices of the rocks along with the rhus coriaria *sumach*, and coriaria myrtifolia: the laurel, the bay, the laurustinus, and Portugal laurel, attain the height of small trees, and yield a cool and shady retreat, even in the midst of a Spanish summer. The smaller flowering shrubs that adorn the woodlands of Spain are too numerous to be particularized, the following are the chief, phillyræa angustifolia, linum arboreum, daphne Gnidium, cytisus nigricans, collutea arborescens, *tree senna*; arbutus unedo, *arbute*; cupressus sempervirens, *cypress*; genista Canariensis and Lusitanica, *Canary* and *Portugal broom*; jasminum fruticans, *yellow jasmine*; rosa Gallica, *Provence-rose*; and mespilus pyracantha.

Where the ground is sufficiently deep and moist for cultivation and rich pasturage, a number of beautiful bulbous-rooted plants appear early in the autumn and spring, and give a peculiar gaiety at that time to the Spanish prospects; two species of asphodel, the ramosus and fistulosus, may be said, in a manner, to overspread the whole country, many also of the following are scarcely less common: amaryllis lutea, *yellow amaryllis*; leucojum autumnale, *autumnal snow-flake*; narcissus jonquilla, *jonquil*; narcissus tazetta, bulbocodium and serotinum; hyacinthus racemosus and comosus, *clustered hyacinth*; erythronium dens canis, *dog's-tooth violet*; anthericum liliastrum; lilium bulbiferum and martagon, *orange* and *martagon lily*; polyanthes tuberosa, and tulipa sylvestris, *wild tulip*. Several strong smelling umbelliferous plants are also natives of Spain, such as cachrys libanotis; anethum fœniculum, *fennel*; ferula communis, which yields the gum sagapenum; and ferula ferulago, from which galbanum is procured. The fallows and dry thickets abound with chamærops humilis, the *fan-palmetto*; lupinus luteus, *yellow-lupin*; fumaria spicata, *spiked fumitory*; spartium junceum and sphærocarpon, *Spanish broom*, and another species with yellow blossoms; spartium monospermum, *white-broom*; and antirrhinum amethystinum. In the hedges, and by the shady road-sides are found the *laurel*, prunus laurocerasus; iris alata and juncea, *winged* and *rush-leaved iris*; atropa mandragora; smilax aspera; digitalis ambigua, lutea, and ferruginea, three species of *fox-glove*; pæonia officinalis, *pæony*; passiflora cærulea, *common passion flower*; anagyris fœtida, *stinking bean trefoil*; and aristolochia rotunda, *birth-wort*.

Both Spain and Portugal are for the most part deficient in water, the rivers flow through rocky channels, and therefore there are few marshes, and still fewer bogs: the sides of rivulets are adorned with the oleander, laburnum, tamarisk, and myrtle, which in these situations grow with unusual luxuriance; with the iris xiphium and pumila, cyperus longus and esculentus, arundo donax, *Spanish reed*, drossera Lusitanica and pinguicula Lusitanica.

The vicinity of Lisbon and Oporto, and of a few other towns on the coast, is remarkable as to its botany, for a number of Indian, African, and American plants, which have gradually strayed out of the gardens, and have become completely naturalized to the soil and climate; the hedges to the fields are not unfrequently formed entirely of the *American aloe*, agave Americana; and the cactus opuntia, *Indian fig*; the rich soil on the bank of the Tagus glows with the splendid scilla hyacinthoides, the

ornithogalum Arabicum, and the allium speciosum; and the sheltered groves and sunny rocks of Belem, present the stately magnolia grandiflora, cercis siliquastrum, phœnix dactylifera, *date palm*; cupressus Lusitanica, a beautiful kind of cypress originally from Goa; thea viridis, tea-tree from China; olea fragrans and gardenia florida, *Cape jasmine*; mesembryanthemum crystallinum, *ice plant*, and several others of the same genus from the Cape of Good Hope; and the fragrant myrica Faya, from Madeira. Of the esculent plants and fruits cultivated in Spain and Portugal, besides those already mentioned, the following are the chief: *wheat*, and *barley*; *rye*, and *rice*, oryza sativa; in small quantity; *oats*, scarcely at all; *maize*, zea mays; *Guinea corn*, holcus sorghum; *millet*, panicum miliaceum, in considerable quantity; *sweet potato*, convolvulus battatas; *plantains*, musa paradisiaca; *chick pea*, cicer arietinum; *lupin*, lupinus albus; *Monk's beans*, dolichos catjang; *Jerusalem artichoke*, helianthus tuberosus; solanum lycopersicon, *love apple*; all the varieties of *gourds*, *cucumbers*, and *melons*; ficus carica, *figs*; grapes, oranges, lemons, bergamot oranges, and all the finer fruits of our English gardens.

Zoology. The glory of Spanish zoology is the horse, which has been famous in all ages, probably originating from the barb, or beautiful and spirited steed from the north of Africa, the immediate offspring of the Arabian. The Spanish mules are also excellent, and the ass is here no ignoble animal, though not equal to that of Arabia; whence a far superior breed of this useful quadruped might be introduced. The cattle seem little remarkable; but the breed of sheep has been long celebrated as perhaps superior to any in the world, for the delicacy of the mutton, and the beauty of the fleece. The purity of the air, and aromatic pasture, no doubt, contribute to both qualities, which, it is to be suspected, would degenerate on transportation. Spain produces one or two quadrupeds and some birds, not known in the rest of Europe, as the Viverra genetta, the Vultur percnopterus, the Cuculus glandarius, the Tridactyla, the Motacilla Hispanica, and the Hirundines melba, and rupestris, all of Linnæus, the latter also found in Carniola.*

Mineralogy. The mineralogy of Spain was anciently of more importance than in modern times. Pliny†, after observing that silver was generally found with galena or lead ore, proceeds to state that the fairest of all silver was found in Spain, where the pits, begun by Hannibal, lasted to his time, being known by the names of their original discoverers. That called Bebelo had yielded to Hannibal 300*lb.* weight a day, a mountain being pierced for a mile and an half, through which the workmen directed large streams of water; so that the plan pursued seems to have been that called hushing by modern writers. Strabo‡ informs us that the province of the Turditani, modern Andalusia, was the most productive of precious metals; and gold, silver, brass, and iron were no where found more abundant, nor of better quality: gold was found in the sands of the rivers and torrents, a known attribute of the Tagus. His account also leads us to infer that hushing was the method

* The Spanish locust is the only one with rose-coloured wings, and seems indigenous. Dillon, 268.

† Lib. xxxiii. cap. vi. ‡ Lib. iii.

practised. That geographer adds, that though the Gauls affected to prefer their precious metals, which were found in Mount Cemmenus, chiefly towards the Pyrenees, or that part of the Cevennes which lies near Foix, yet the Spanish were doubtless superior, lumps of pure gold being sometimes found half a pound in weight; but it was frequently discovered in the state of electrum, or mingled with silver. Strabo also mentions gold and silver mines among the Artabri in the north of Portugal; and Polybius informs us concerning the mines of silver near Carthagena, which occupied a number of workmen, and yielded to the Romans 25,000 drachms daily. Other mines of silver were found near the sources of the Bætis. This intelligence becomes of the more importance, as Britain and other regions of the west certainly derived their gold and silver from Gaul and Spain, in return for cattle, hides, and other products.

At present almost the only silver mines in Spain are those of Guadalcanal, in the Sierra Morena, but rich veins of that metal, in a fuliginous state, exist in many places*. At Almaden in La Mancha are valuable mines of quicksilver, which are chiefly remitted to Spanish America, and employed in refining the more precious metals. Calamine appears near Alcavas: cobalt in the Pyrenees; antimony in La Mancha; copper on the frontiers of Portugal†; tin in Galicia; and lead s common in many districts. The iron of Spain is abundant, and still maintains its high character; and coals are found in the district of Villafranca, in Catalonia, where also occur gold, silver, copper, and lead‡. Amber and jet (in Spanish *azabache*) are found together in the territory of Beloncia in the Asturias. The amber is bedded in slate, and presents a woody appearance, but when broken there are white nodules, enclosing the substance which is of a bright yellow. The other minerals are rather curious than important, such as the beautiful crystallized sulphur found at Conilla, not far from Cadiz, the elastic marble of Malaga, the green marble resembling the Verde Antico found near Granada, and the red gypsum with red crystals of Compostella. Murcia produces that fine red earth, called *almagra*, with which the Spanish snuff is mingled||. The aventurine seems a Spanish name, and a Spanish discovery, being a felspar sprinkled with a golden mica, discovered in Arragon, and near the cape de Gata in Granada, but fine specimens are also brought from Piedmont; and according to some late mineralogists, the richest are the Russian, from the little isle Cedlovatoi, in the White Sea.

Mineral Waters. Spain contains many mineral waters, but few are celebrated. The hot springs of Rivera de Abajo are situated not far from Oviedo, and bear some resemblance to those of Bath. Near Alicant are the baths of Buzot, warm springs of a chalybeate nature, rising like the former among calcareous hills.

Natural Curiosities. The natural curiosities of Spain have been little illustrated. The rock of Gibraltar, as is well known, in some

* Journal des Mines, An. v. 387, &c.

† See Dillon, 196, for an account of the copper mine of La Platilla, near Molina.

‡ Towns. iii. 344, 345.

|| J. des M, Ib.

parts contains bones which have been supposed to be human; but are now discovered to belong to quadrupeds, and to have been deposited in the fissures from above. This rock is chiefly calcareous, and on the west side is a stalactitic cave, called St. Michael's. The river Guadiana, rising in a calcareous country, appears and disappears like some of our streams in the north of England under similar circumstances. A deep and rugged dale near Alberca, in Estramadura, once attracted great notice from the singular manners of the inhabitants*.

* Dillon, 270.

SPANISH ISLES.

THE chief circumjacent islands belonging to Spain are Majorca, Minorca, and Eviza; or, according to Spanish orthography, Mallorca, Menorca, Ibiza.

MAJORCA. Majorca is about fifty-five English miles in length, by forty-five in breadth. The north-west part is hilly; the rest abounds with cultivated land, vineyards, orchards, and meadows; the air is temperate, and the honey highly esteemed: there is generally a considerable military force in the isle. The capital, seated on a fair bay, is an elegant city, and is supposed to contain 10,000 inhabitants. Here was born the famous Raymond Lully, a visionary of the fourteenth century. Majorca was re-conquered from the Moors by James I, king of Arragon, in 1229. In 1262 it was assigned to a prince of the house of Arragon: James, the first king, died in 1311, aged sixty-eight; and was succeeded by Sancho; who in 1324 was followed by James II, defeated and slain in 1349 by the army of the king of Arragon, to which crown the isle reverted. James II, king of Majorca, drew up a code of Palatine laws, for the domestic government of the palace, which is still extant.

Majorca is generally in too strong a state of defence to admit of an easy conquest, but Minorca has been repeatedly seized by the English, to whom it presents an advantageous station for the Mediterranean trade.

MINORCA. It is about thirty miles in length, by about twelve of medial breadth. The air is moist, and the soil rather barren, being chiefly calcareous, with lead, and fine marble. The wine is praised; and the inhabitants retain a share of their ancient reputation as excellent slingers. Cittadella, the capital, has a tolerable haven, but the population and fortifications are of little consequence. Port Mahon, on the south-east, has an excellent harbour: and received its name from Mago the Carthaginian general.

EVIZA. Eviza is the nearest to Spain, about fifteen miles long and twelve broad. It is remarkable for it fruits, and abundance of excellent salt.

TURKEY IN EUROPE.

CHAPTER I.

HISTORICAL GEOGRAPHY.

NAMES.—EXTENT.—BOUNDARIES.—ORIGINAL POPULATION.—PROGRESSIVE GEOGRAPHY.—HISTORICAL EPOCHS AND ANTIQUITIES.

THE Turkish empire, once so formidable to Europe, has lately sunk before the power of Russia; and may probably, at no very distant period, be utterly annihilated, or reduced to a few Asiatic provinces. Yet ancient fame conspires with the remaining extent and population of the Turkish dominions, to entitle this power to a place among the preponderating sovereignties both of Europe and Asia. Turkey in Europe is computed to contain 182,560 square miles; an extent which exceeds that of Spain, or even France under the ancient monarchy; and must therefore still be classed among the leading powers even of this quarter of the world.

NAMES AND PROVINCES. As European Turkey forms a recent sovereignty, the greater part of which was subjugated in the fifteenth century, after the fall of Constantinople and of the Byzantine empire, there is no ancient appellation for its whole extent. It embraces many ancient kingdoms and republics, which not only afford a melancholy remembrance of classical names and events. Moldavia, the most northern province, was part of ancient Dacia; and Jassy the capital was the *Iassiorum Municipium* of the Romans. Budzac, or Bessarbia, was a country of the Getæ and Peucini. Walachia was also a province of the ancient Dacians; while Bulgaria on the south of the Danube embraces nearly the two provinces of Mæsia. Romelia, a vast territory,

contains ancient Thracia, Pæonia, Macedonia, and the northern part of the classical country of Greece; while the Morea is equivalent with the ancient Peloponnesus. To the west of Romelia extends Albania; which includes the kingdom of Epirus, Chaonia, and a part of Illyricum. Dalmatia retains its ancient appellation; while Servia and Bosnia represent ancient Pannonia. Turkish Croatia, the most western province of the empire, also forms a portion of ancient Pannonia, with perhaps, a small district of Noricum; but the Turkish part of Croatia is a diminutive province, about forty miles in length, by twenty in breadth, limited by the river Save on the north, and partly by the river Unna on the west.

In recent times Turkey has lost the provinces of the Krim, and New Servia, which, with several Asiatic districts, have become subject to Russia; and on the west, Transylvania, Slavonia, with the Buckovin, a part of Moldavia, and a great part of Croatia, have fallen under the power of Austria.

EXTENT. Turkey in Europe extends about 870 miles in length, from the northern boundary of Moldavia, to Cape Matapan in the Morea. The breadth, from the river Unna to Constantinople, is about 680 British miles. The eastern and southern boundaries are formed by the Euxine or Black sea, the sea of Marmora, the Archipelago, and the Mediterranean. The utmost northern limit, is now the river Dniester; but the western often consists of an arbitrary line, and is sometimes supplied by rivers or mountains.

ORIGINAL POPULATION. The original population of this empire, chiefly sprung from the ancient Scythians on the Euxine, the progenitors of the Dacians, Thracians, &c. and even of the Greeks. These were originally blended towards the north, with many Sarmatic or Slavonic tribes: and, on the fall of the Roman empire, the latter spread more and more towards the south, so that nearly one half of the population may now be regarded as Slavonic; but Walachia is supposed to contain many descendants of the ancient Roman settlers in Dacia. The extent of the Turkish empire has contributed to mingle this original population with various Asiatic races, among whom the Turks themselves deserve particular mention. That branch called the Ottomans, which has proved so destructive to Europe, derive their name from the Calif Othman, who reigned in the beginning of the fourteenth century, and extended his sway into the plains of Bithynia, in which he conquered Nicomedia and Prusa, and thus approached even to the gates of Constantinople*. But the name and power of the Turks are of far more remote antiquity. They are supposed to have descended from the Altaian mountains in Tartary, about the middle of the sixth century; and spread gradually towards the west, till they reached the lake Mæotis†. Yet the strength of the empire restricted them to the region near the river Oxus, whence the Califs derived their Turkish guards, who afterwards subverted the throne of Bagdad. The Hungarians, who spread destruction through great part of Europe in the tenth century, are supposed to have been a branch from the Turkish stem: but the Turks, or Turkomans, properly so called,

* Gibbon, xi. 432. † Ibid. vii. 284.

spread from the Oxus and Samarcand to the east of Persia, where Mahmoud of Gazna established a powerful kingdom, subdued by the Turks of Bochara, who, in the eleventh century founded the dynasty of the Seljuks. The Sultans of this race gradually extended their power towards the west, and Armenia and Georgia were among their first acquisitions in the Byzantine empire; the continuation of which seems remarkable, when it is recollected, that the Turks had almost subdued the whole of Asia Minor, before the commencement of the twelfth century. Yet the progress of the crusades checked the extension of the Turkish sway, and by the capture of Nice, constrained them to remove the seat of power to Iconium. Towards the middle of the fourteenth century, the Turks first passed into Europe; and soon after seized the greatest part of Thrace. In the beginning of the fifteenth century, their Sultan Bajazet extended his conquests even to the Danube; and the Provinces of Thrace and Macedonia, fell under the Turkish sceptre, while Adrianople became the seat of their government.

From this deduction it will appear that it was chiefly with European troops that the Turks finally subverted the Byzantine empire. From the diversity of nations which joined their standard, from intermarriages with women of Circassia, and many other circumstances, which need not here be recapitulated, the modern Turks may be regarded as a mixture of many races of men. If they originally sprung from the Altaian mountains, as the best records induce us to believe, they seem to have formed a part of the nations styled by the ancients "the Scythians beyond the Imaus;" and their subsequent settlement on the Oxus, must have swelled their population with Sogdian and Bactrian tribes.

Progressive Geography. The progressive geography of Turkey in Europe is reflected in the greatest lustre from the classical pages of antiquity, and through the annals of the Byzantine empire to modern times. It would be idle to repeat the well known geography of ancient Greece, and of the regions to the north of that illustrious seat of arts and letters. Under the Byzantine empire, in the tenth century, they equalled any European provinces, or *themes* as they were quaintly denominated; and while that of the Peloponnesus contained no less than forty cities, we lament the devastations of the Ottoman barbarians, whose only power is to destroy, and whose baleful sway extinguishes all industry and prosperity. The Turkish division into provinces has been already stated; and it may perhaps be speedily the office of geography to repeat the new provinces established by the Russians and Austrians.

Historical Epochs. It would be equally difficult and unsatisfactory, minutely to state the historical epochs of this extensive dominion, containing so many ancient kingdoms and states. It shall therefore be only premised, that, after the Roman arms had subdued these countries and cities, many of which are celebrated in the most ancient pages of history, they became, in the fifth century, an important part of the Byzantine empire; and the historical epochs most appropriated to the present design, will delineate their gradual subjugation by the Turks.

1. The first dawn of Turkish history, preceding the reign of Othman, A. D. 1299.

2. In the reign of his successor, Orkan, the Turks take Gallipoli, and penetrate into Thrace; which province was soon after conquered, and Adrianople was taken A. D. 1360. Two years afterwards, the Sultan Amurath established the famous military bands called janizaries composed of Christian slaves, educated in Mahometanism from their infancy.

3. The reign of Bajazet, who defeats the Hungarians at Nicopoli, in Bulgaria, A. D. 1396. In 1402 the famous battle near Ancyra, between Bajazet and Timur, which for a period checked the Turkish power: yet in 1412 the emperor Sigismond was defeated by the Sultan Mousa with great slaughter.

4. The Turks continue to increase their dominion in Europe, though they received severe checks from the Hungarians, under Hunniades, and even from the Albanians commanded by the celebrated George Castriota, called by the Turks Scanderberg.

5. Constantinople taken by the Turks on the 29th of May, 1453. In 1456 the siege of Belgrade by Mahomet II. Corinth and the Morea became subject to the Crescent A. D. 1458. In 1480 Otranto in Italy was taken by the Turks, an event which diffused great terror throughout Europe.

6. A considerable accession to the Turkish power by the conquest of Egypt, A. D. 1517. In 1522, Rhodes submits to the Turks: the knights were afterwards transferred to Malta. In 1526, the noted battle of Monatz, in which Lewis king of Hungary perished, and the Sultan Soliman soon after took Buda. In 1529 he besieges Vienna at the head of 250,000 men, but the city being bravely defended by Frederic, prince palatine, the Turks withdrew with great loss. In 1552, the Turks siezed the Bannat of Temeswar: and took Cyprus from the Venetians in 1571.

7. In the same year was the famous naval battle of Lepanto, which delivered Europe from any apprehension of the Turks by sea. They continued, however, to invade Hungary with various success. But their wars with Persia gradually diverted their arms from Europe. In 1642, the Sultan Ibrahim took from the Cossacs the town of Azof, at the mouth of the Don. Towards the middle of this century, they seized some Grecian isles, which the naval power of the Venetians had enabled them to retain.

8. Mahomet IV, renews the wars against the Emperor of Germany; and in 1663, the Austrians were defeated in Hungary. The isle of Candia is taken in 1669 after a long blockade and siege. Wars with Poland, the siege of Vienna, 1683, raised by John Sobieski king of Poland. Hungary became the scene of repeated Turkish and Austrian conquests, till 1699, the peace of Carlowitz, by which the Turks yielded Transylvania to the Austrians, the Morea to the Venetians, and Azof to the Russians.

9. In 1736, a successful war with the Russians and Austrians; the Turks by the peace of 1739, resumed Belgrade and Orsova, with some parts of Servia and Walachia, formerly ceded to Austria; and Russia is constrained to abandon Azof.

10. The more recent wars of the Russians against the Turks, and the subsequent decline of the Ottoman empire.

Some of the events here commemorated are comparatively minute; but the Turkish power has been so destructive, wherever it spread, to the best interests of humanity, that even the smaller ramifications of such a pestilence seem not undeserving of being commemorated, with the same curiosity that natural historians describe the utmost extent of an earthquake.

ANTIQUITIES. The ancient monuments of European Turkey are well known to exceed in number and importance those of any other country. The remains of ancient Athens, in particular, formerly the chosen seat of the arts, have attracted the attention of many travellers, and have been so repeatedly described, that any further comment would be superfluous. A venerable monument of antiquity, the church dedicated to the divine wisdom, or vulgarly Sancta Sophia, by the Emperor Justinian, in the sixth century, has been fortunately preserved, by being converted into a mosque, though the architecture be greatly inferior to that of the classical period, yet the effect is grand and impressive, and the cupola is admired as a bold and skilful effort of the art, while the seeming weight is diminished by the lightness of the materials, being bricks formed of a particular clay which will float in the water*. The interior is adorned with a profusion of marble columns, of various beautiful descriptions, the purple Phrygian, the Spartan green, the red and white Carian, the African of a saffron colour, and many other kinds. The other antiquities of Constantinople, and other parts of European Turkey, would occupy many pages in the bare enumeration, which would be little gratifying to the reader whose curiosity will be better satisfied by the prints, than by any description of such objects, which can never convey distinct ideas. Suffice it here to observe, that the French have recently discovered the remains of the ancient sea-port, belonging to Sparta, near a barren promontory, which projects from the south of the Morea; and that the antiquities and geography of that part now styled Albania, still present a field of research to the enterprising traveller.

* Gibbon, vii. 120.

CHAPTER II.

POLITICAL GEOGRAPHY.

RELIGION.—ECCLESIASTIC GEOGRAPHY.—GOVERNMENT.—LAWS.—POPULATION.—COLONIES.—ARMY.—NAVY.—REVENUES.—POLITICAL IMPORTANCE AND RELATIONS.

RELIGION. THE religion of the Turks is the Mahometan: but of their subjects, in this division of the empire, it is probable that two-thirds are Greek Christians: a circumstance which would facilitate and endear the dominion of the Russians, who follow the same persuasion. The religion of Mahomet, has been recently cleared from many erroneous representations; but its pernicious effects are sufficiently visible in the destruction of art and industry, wherever it has made its appearance. The exclusive attachment to the Koran, the rigid fanaticism, and the contempt for profane knowledge, conspire with the devout hatred against all unbelievers, to prevent any intercourse with other sects, and thus to erect a barrier against every branch of science and industry. While the Mahometans regard all other nations as dogs, to use their own expression, it is no wonder that they themselves should sink into an ignorance and apathy, truly brutal. This single principle of usurped superiority, must ever render them inferior to other nations; but as the Turkish Sultan has been for some centuries the chief leader and support of this devouring system, of which his subjects themselves begin to perceive the defects, it is to be conceived, that his fall would considerably weaken the Mahometan faith; and that those proud usurpers of all human virtue and merit, would find their former arrogance returned with due contempt by surrounding nations. The Mufti, or Mahometan pontiff, presides at Constantinople; but his power has seldom interfered with the civil government. Next to him in rank, are the Moulahs, who, though esteemed dignitaries of the church, are, in fact, rather doctors of the law, while the Koran is also a code of civil observance, and is expounded in numerous treatises which regulate the proceedings of the ecclesiastic judges*. From the Moulahs are selected the inferior Muftis, or judges, throughout the empire; and the Cadilesquiers or chief justices.

The next class of divines are the Imaums, or parish priests, who perform the service of the mosques, while the Cadis are judges annually appointed to administer justice in the towns and villages, being them-

* Porter's Observations on the Turks, p. 41, &c.

selves to be regarded as churchmen, who, like the Moulahs, have directed their chief attention to the juridical part of the Koran.

From this brief view it will be observed, that the ecclesiastical orders of Muftis and Imaums, somewhat resemble the Christian bishops and parochial clergy: while the other distinctions arise from the singularity of both religion and laws being united in the Koran, so that a lawyer or judge must at the same time be a skilful divine.

The Turks have also their monks, styled Dervishes, of four various orders and institutions, dedicated by solemn vows to religious offices, public prayer, and preaching. A most singular order is that of the Kadri, who appear almost in a state of nudity, and affect to display their devotion by frantic and extravagant dances.

The Greeks, along with their faith, retain their priests, bishops, archbishops, and patriarchs; but their church is in the last state of degradation, and its dignities openly sold by the Turks. Travellers have expressed the deepest regret at this abomination, arising partly from the Mahometan delight in rendering the Christians contemptible; and partly, it must be confessed, from the miserable ambition and avarice of the Greek ecclesiastics, who think they can atone, by idle ceremonies, for the neglect of all the invaluable morality of the gospel.

Ecclesiastic Geography. The ecclesiastic geography of these degraded regions, must, of course, be only interesting to the mere antiquary, as it can throw no light on its history, and little even on its topography.

Government. The Sultan is a despotic sovereign, but he is himself strictly subject to the laws of the Koran, which, including also the national religion, raise such obstructions to his absolute will, that an intelligent traveller pronounces many Christian sovereigns more despotic*. Yet the same author allows, that in order to secure private property, the reversion is commonly assigned to the church, which would thus, in time, swallow up all the estates and possessions of the empire. In no European country, has the government ever been so despotic, that a recourse to similar practice became necessary. But it appears, that the despotism of the monarch, is balanced by a religious aristocracy; and, not to mention the insurrections of Janizaries or Prætorian bands, the common peril of every despotic administration, the recent disasters have greatly infringed the power of the Sultan: for many Pashas have usurped the sovereign power over their own provinces, and set every effort of the Porte at defiance, than which there cannot be a stronger symptom of the perdition of the empire.

Laws. The Turkish laws, as has been already mentioned, are contained in the Koran, and in the comments of approved and renowned doctors. As, unhappily, no religious system has ever made its first appearance amid a great and enlightened nation, but only in small tribes, and in the first steps of the social progress, so the laws of the Koran, however well adapted to a few poor and simple Arabs, yet, as Mahomet had no vision of the glories of Bagdad, Ispahan, Samarcand, Delhi, Cairo, Cordova, or Constantinople, his code little provides for

* Porter, p. 76.

the advanced stages of society. To supply this defect, successive Moulahs of high reputation, using the Koran as a kind of text, have constructed commentaries which have acquired the force of laws. The Turkish empire is chiefly guided by those of Abou-Hanife. As a due skill in these commentaries requires considerable study, ecclesiastics, versed in this science, became, in some degree, a distinct body, from those merely dedicated to the priesthood. The laws concerning property are sufficiently equitable; and it is a gross mistake, to suppose that females do not inherit; but it would be vain to deny, that the avarice of the Pashas, and the venal disposition of the priests, would overleap the barriers set even by Mahomet, and much more those appointed by his commentators. The written laws of a country may be excellent, while the male-administration leads to every oppression; and the most enlightened travellers leave no doubt, that any decision may be purchased from a Turkish judge. Where both parties have nothing to give, and the judge is free from caprice, perhaps a shadow of justice may be expected.

Population. Turkey in Europe has been computed to contain 8,000,000 of inhabitants; and the extent being supposed 182,560 square miles, the allotment will be forty-three to the square mile. It is probable that this number rather exceeds the truth, when it is considered that these regions are intersected by many mountainous and barren tracts; and that the population, even of the best provinces, impresses all travellers with a striking defect.

Colonies. A Turkish colony would be a contradiction in terms, as far from any thought of improving distant regions, they are busy in destroying their own.

Army. The Turkish army and navy may deserve more particular consideration under the head of Asiatic Turkey, as the chief sources fall under that division. It may here be briefly remarked, that there are about thirty ships of the line; while the army, after the defection of many Pashas, can scarcely exceed 150,000, ill disciplined, and dispirited by successive disasters; and more destructive to their own provinces, through which they must pass, than to any state with which they are at enmity; more terrible to their friends than to their foes.

Revenues. The revenues of the whole Turkish empire are computed at about 7,000,000*l.* sterling, while the usual expense does not exceed five. This revenue is partly derived from the capitation tax on unbelievers, and from the *zecchat* or customs; but principally from the tax on land, amounting to about six shillings an acre, and which is called the *jizie*. The Sultan is also supposed to possess a considerable private treasure; which, when called forth by the exigencies of the state, will probably be found of as small account, as the treasures of similar fame, which fell into the hands of the French. A more real treasure may be expected from the arbitrary exactions from the rich, particularly the Christians.

Political Importance and Relations. The palpable and rapid decline of the Turkish empire, has, of course, greatly impaired its political importance. At the beginning of the sixteenth century, when European politics began to assume some consistency, France,

being alarmed by the growing power of the house of Austria, entered into an alliance with Turkey, the repeated subject of murmur among the Christian powers. Nor was this alliance of much advantage to France, except in securing a more favourable mercantile reception in the Levant; for the diversions thereby afforded to the Austrian arms were seldom well timed, or of much importance. This long alliance has been recently violated by the imprudence of the French rulers, who chose to attack Egypt by open force, without the consent of the Porte, which, deriving little or no advantage from that nominal sovereignty, would gladly have given it to France as a reward for any active services. In consequence of this violation, the Porte joined the Austrians and Russians, in the war against France; but the Crescent did not appear on the French frontiers. In virtue of this alliance, Russian squadrons of war have passed the sacred walls of the seraglio, and inspected, as friends, that weakness which may assist them as enemies. Politicians considered this alliance as a mere temporary friendship, produced by violent circumstances; and it is probable that not many years will elapse, before Russia and Austria again conspire against European Turkey. The Turks are sensible, that a strict alliance with Prussia would be of singular advantage to them; that power can have little interest in such a treaty, but must, on the contrary, rather exult to see the power of Russia exerted against Turkey and Asia. Meanwhile, the Turks have spared no endeavour to secure the friendship of several European powers, and have appointed resident ambassadors at several courts, who may be regarded as the heralds of their fall; for, in their prosperity, they disdained to send any envoys, and regarded the ambassadors at the Porte as tributary slaves, sent to solicit the protection of the Sultan. Amidst the defection of several Pashas, in the east, as well as in Europe, it is fortunate for the Ottoman empire, that the power of Persia is dormant.

CHAPTER III.

CIVIL GEOGRAPHY.

MANNERS AND CUSTOMS.—LANGUAGE.—LITERATURE.—EDUCATION.—UNIVERSITIES.—CITIES AND TOWNS.—EDIFICES.—ROADS.—INLAND NAVIGATION.—MANUFACTURES AND COMMERCE.

MANNERS AND CUSTOMS. THE manners and customs of the Turks are distinguished by the peculiarity of their religion from those of other European nations. On the birth of a child, the father himself gives the name, putting at the same time a grain of salt into its mouth*. The circumcision is not performed till the age of twelve or fourteen. Marriage is only a civil contract, which either party may break, and is managed by female mediation, the youth seldom seeing his bride till after the ceremony. The dead are perfumed with incense, and buried in a cloth, open at the top and bottom, that the deceased may be able to sit up and answer the questions of the angels of death. The burial-grounds are near the highways, and stones are often placed at the head of the graves, with carved turbans denoting the sex. As they never entrench upon a former grave, the cemeteries are very extensive. In diet, the Turks are extremely moderate, and their meals are dispatched with great haste. Rice is the favourite food, and is chiefly dressed in three ways; the pilau, boiled with mutton or fowl; the lappa, or mere boiled rice; and the tchorba, a kind of broth of the same vegetable. In boiling, the meat is cut in small pieces; and in roasting, still smaller, a bit of meat and an onion, being placed alternately on a very long spit. The fish of the Archipelago are excellent; and the beef tolerable, except that of the buffalo which is very hard. The hares, partridges, and other game, are of superior flavour. The meal is usually spread on a low wooden table, and the master of the house pronounces a short prayer. The frugal repast is followed by fruits and cold water, which are succeeded by hot coffee, and pipes with tobacco. The houses of the Turks are seldom expensive; and the chief furniture is the carpet, which covers the floor, with a low sofa on one side of the room. In regard to dress, Tournefort† observes, that the use of the turban is unhealthy, because the ears are exposed, and its thickness prevents perspiration. The shirt is of calico; and the loose robe is fastened by a girdle, in which is

* Tournefort, i. 47. † i. 79.

stuck a dagger; while the tobacco box, pocket book, &c. are worn in the bosom. The robe is generally of European broad cloth, trimmed with various furs. The shoes, or rather slippers, are slight, and unfit for much exercise. The dress of the women differs little from that of the men, the chief distinction being the head-dress; that of the fair sex consisting of a bonnet, like an inverted basket, formed of pasteboard, covered with cloth of gold, or other elegant materials, with a veil extending to the eyebrows, while a fine handkerchief conceals the under part of the face. The personal cleanliness of both sexes is highly laudable; but the European eye is not pleased with the female custom of staining the nails with a red tincture. The amusements of the Turks partake of their indolent apathy, if we except hunting, and those of a military description. To recline on an elegant carpet, or in a hot season, by the side of a stream, and smoke the delicate tobacco of Syria, may be regarded as their chief amusement. With opium they procure what they call a kief, or placid intoxication, during which the fancy forms a thousand agreeable images, but when the dose is too potent, these are succeeded by irritation and ferocity. Chess and draughts are favourite games; but those of chance are considered as incompatible with strict morals. The coffee houses and the baths, furnish other sources of amusement; and the bairam, or festival, which follows their long lent, is a season of universal dissipation.

Language. The Turkish language is of far inferior reputation to the Persian or Arabic, being a mixture of several dialects, and possessing neither the force, elegance, nor purity of those two celebrated oriental tongues. Literature is not, however, totally neglected, and it has been repeatedly attempted to establish a printing press at Constantinople; but the design failed, from the interest of the copyists, who inferred, that this art would deprive them of their bread. A late traveller* informs us, that there are in this capital several *kuttub-chans*, or public libraries, among which are those of St. Sophia, and the Solimanie Jamasy; but none so elegant, as that, founded by the grand vizir Raghid, which is wholly built of marble, in the midst of a square court, and is filled with books, chiefly theological. A librarian constantly attends, and there are convenient seats, with carpets and cushions. In the neighbourhood is a school, founded by the same vizir, in which about one hundred boys are taught to read and write. The market for books is extensive, containing many shops, well supplied with oriental manuscripts. The Turks have their ancient poets, historians and divines; but of little reputation, when compared with those of Persia or Arabia.

Education. The state of education among the Turks, may be conceived to be very low, and ignorance is, indeed, a chief part of the national character. The only profession which requires a shadow of learning, is that of the law, which, as before explained, is intimately connected with their theology. The celebrated doctors have disciples, who are trained up to that department; but there seems nothing that can deserve the name of college or university.

* Browne, p. 422.

CITIES AND TOWNS. The chief city of European Turkey, and of the Turkish empire, is Constantinople, so called, because founded by Constantine, on the site of the ancient Byzantium. The advantages of the situation can hardly be exceeded, and the aspect from the sea is peculiarly grand; but on a nearer approach, the wooden hovels, and narrow streets, disappoint the splendid expectations of the spectator. The beautiful description by Gibbon, is known to every reader; and recent travellers have applauded its accuracy*. This capital forms an unequal triangle, resembling a harp, being about twelve or fourteen English miles in circumference, enclosed by walls, and on two sides by the sea, and the harbour called the Golden Horn. The inhabitants are computed at 400,000, including the four suburbs, Galata, Pera, Tophàna, and Scutari. Of these 200,000 are Turks: 100,000 Greeks, and the remainder Jews, Armenians, and Franks. The most celebrated edifices are the Seraglio, which comprises a large space, crowded with various buildings of mean architecture; and the mosque of Sancta Sophia, already mentioned. The principal entrance of the Seraglio is styled Capi, or the Porte, an appellation which has passed to the Turkish court. The frequent visitations of the pestilence, and the conflagrations, often kindled by popular discontent, render Constantinople an unpleasant residence.

ADRIANOPLE. Next in dignity and extent, is the city of Adrianople, formerly the European seat of the Turkish dominion. This city, which stands about 140 British miles to the north-west of Constantinople, was founded by the emperor Hadrian, on the site of the ancient Orestias. It is washed by the Hebrus, now the Maritz, which here receives two tributary streams†. This second city of European Turkey is of a circular form, surrounded by a wall and towers. Many of the houses are respectable, but the streets are narrow and indirect. The seraglio is in a pleasant situation, separated from the city by the river Arda, and commanding an extensive view of the country, which is fertile, and remarkable for excellent vines. Several of the mosques are of celebrated splendor, and the commerce of the city by the river is not inconsiderable‡.

Filibe, or Filipopoli, is meanly built, without fortifications, or one good street; the situation being so low and moist, that the mud is sometimes two feet deep, and stones, like posts are set up, to facilitate the progress of foot passengers. Yet it is a city of considerable size‖.

SOFIA. The city of Sofia, situated in a low country, north-west from Adrianople, is of considerable trade, but meanly built; the inhabitants are computed at 70,000.

Silistria in Bulgaria, on the river Danube, is computed to contain 60,000 souls; while Bucchorest, the chief city of Walachia, is estimated at the same number; but Jassy, the leading town of Moldavia, and Bender of Bassarbia, are only estimated each at 10 or 12,000.

* Dallaway's Const. 15. † Busching, iii. 340.

‡ Add, from the information of a late traveller in MS., that this city is nearly two miles in circuit, unfortified: on the south-east is a large mosque on a hill, whence the city slopes to the north-west.

‖ MS. information.

BELGRADE. Belgrade, the capital of Servia, repeatedly disputed between the Austrians and Turks, is now destitute of fortifications, but is supposed to retain about 25,000 inhabitants. Banjaluka in Bosnia is also a considerable town, supposed to contain 18,000 souls.

SALONICA. In the more southern provinces must first be named Salonica, computed at 60,000, a city of considerable commerce, seated on a noble gulf of the Archipelago. About eighty British miles to the south is Larissa, an inland town, but supposed to contain 25,000 souls. Atini, the ancient Athens, is of small population; and this region of classical cities now scarcely presents another town worthy of commemoration in general geography.

EDIFICES. Exclusive of the seraglios and royal palaces, which themselves possess little claim to architectural grandeur or beauty, the chief edifices in Turkey are the mosques and caravanseras. The most beautiful mosques are those of the capital and Adrianople, and are generally kept in excellent repair, as the church possesses ample revenues for that purpose, and the interest and honour of the clergy are promoted by preserving their splendor. The caravanseras, on the contrary, are often neglected. These buildings are generally in the form of a square, enclosing a court; the upper chambers being destined for travellers, and the lower for horses and camels. They are often founded by legacies of the opulent; but the trustees, having no personal interest, generally squander or alienate the funds, allotted for their support, so that these useful edifices, some of which boast superior elegance, are permitted to fall into shameful decay.

MANUFACTURES AND COMMERCE. The manufactures and commerce of Turkey in Europe, are chiefly in the hands of foreigners; but as what is called the Levant trade, almost entirely centers in Smyrna and the Asiatic shore, this subject will be more properly described in that part of this work which relates to Asia. The native manufactures exported from European Turkey, are inconsiderable, being chiefly carpets, and a few other articles; but the rude products are far more numerous, as currants, figs, saffron, statuary marble from Paros, silk, and drugs.

CHAPTER IV.

NATURAL GEOGRAPHY.

CLIMATE AND SEASONS.—FACE OF THE COUNTRY.—SOIL AND AGRICULTURE.—RIVERS.—LAKES.—MOUNTAINS.—FORESTS.—BOTANY.—ZOOLOGY.—MINERALOGY.—MINERAL WATERS.—NATURAL CURIOSITIES.

CLIMATE AND SEASONS. THE extensive regions comprised within the limits of European Turkey, enjoy, in general, a delicious climate, pure air, and regular seasons. Ovid, who was banished to modern Bulgaria, has written many elegiac complaints on the severity of the clime; and it seems an undoubted fact, that the seasons have become more genial, since Europe has been stripped of those enormous forests, which diffused humidity and cold: for countries, anciently represented as full of morasses and water, are now dry and salubrious; and the rivers are not only confined to narrower channels, but many that used to freeze every winter, now devolve a turbid but free stream. The climate of Moldavia, which Ovid would have painted like that of Lapland, is now little inferior to that of Hungary, though the western part be mountainous, and the eastern presents many uncultivated deserts. In Walachia the air is so temperate, that vines and melons prosper. In the mountainous parts of the more southern districts, the temperature must partake of the cold, universal in such elevated regions; but the products of Macedonia and Greece, rice, vines, olives, shew that the climate retains its ancient praise.

FACE OF THE COUNTRY. The general appearance of Turkey in Europe is rather mountainous; but abundantly interspersed with delicious plains and vales; and to the north-west of Constantinople there is a plain country of vast extent, while the shores of the Euxine present many level deserts. Besides the grand stream of the Danube, many large and beautiful rivers intersect these provinces, and the numerous gulfs of the Archipelago and Mediterranean diversify and enrich the country.

SOIL AND AGRICULTURE. The soil is generally fertile, the northern parts producing wheat and rich pasture, the middle and southern, abundance of rice. But agriculture, like every other art and science, is neglected by the Turks; and that soil must be truly fertile which, under their sway can support its inhabitants.

RIVERS. Among the rivers of European Turkey must first be named the Danube, which, from Belgrade to Orsova divides Servia

from the Bannat, a space of near 100 miles; and afterwards becomes a Turkish stream for more than 400, being in some places a mile in breadth, and presenting, if possessed by an industrious people, all the advantages of a Mediterranean sea.

MARITZ. Next perhaps in importance, though very inferior, is the Maritz, or ancient Hebrus, which rising in a chain of mountains anciently called Hæmus, and running towards the east and south, falls into the Ægean sea, after a course of about 250 miles. The same sea at the gulf of Salonica receives the Vardari, the ancient Axius, which rising in mount Scardus, a western branch of the same chain, pursues a south-east course of about 200 miles.

Two other rivers of similar consequence flow into the Danube.

ESKER. The Esker, the ancient Oeskus, rises near the source of the Maritz, but its course little exceeds 120 miles; while the Morava, the ancient Margus, runs about 200. The Drin, another considerable river, rises to the north of Albania, and falls into the Save.

Many other streams of classical name pervade these regions; but they often derive their sole importance from their historical and poetical reputation.

LAKES. Budzac and Walachia contain some lakes of considerable extent, as those around Ismail, and that to the east of Surza, which communicates with the Danube, or forms a part of that river. Nor are Albania, and the southern provinces, wholly destitute of lakes, but rather of classical fame than of geographical importance.

MOUNTAINS. The chains of mountains are numerous and extensive. To the west of Moldavia and the Bukovine runs north and north-west for about 200 miles, part of the grand Carpathian chain, anciently called the Bastarnic Alps, from the Bastarnæ, an extensive nation, partly of Gothic and partly of Sarmatic origin. The most southern branch of this grand chain, tending south-west for more than 200 miles, forms the north and west boundary of Walachia. Ptolemy here delineates mount Peucé, which seems the same with the Bastarnic Alps; while the southern branch may be his Sarmatic mountain; nor do the mountains between Walachia and the Bannat seem distinguished by any modern appellation, except of particular summits, as the Graysor, the Pietrotza, the Semenek.

HÆMUS. On the south of the Danube appears the grand range of the Hæmus, which Ptolemy represents as running from the south-west to the north-east, while modern observations indicate the opposite direction; but the recent maps of these regions are still very imperfect. D'Anville, in his Ancient Geography, considers the Rhodopé as a chain of mountains on the western side of ancient Thrace; and the Hæmus as its northern frontier: but this distinction is unknown to Ptolemy, who, on the contrary, places Rhodopé towards the north of Thrace, representing it as a branch of the Hæmus. However this be, the chain of the Hæmus is deservedly celebrated by the ancients, being of great elevation and extent, as appears from the numerous and large rivers which devolve from its sides. The middle parts of this chain were by the ancients called Scomius and Orbelus; while the Scardus may be considered as its furthest branch on the west. If with D'Anville we place the *Hæmi extrema*, the furthest eastern point of the

Hæmus at Emineh, and thence extend it above Filipopoli and Sofia to the south of Servia, we shall find an extent of more than 400 miles, now known under various names, as Emineh, or Hemineh Dag, perhaps a remnant of the ancient appellation, on the east: Bulkan and Samoco in the middle; Ivan west: while the Despoto Dag branches off to the south-east, and may perhaps be the Rhodopé of the ancients. But while the proper delineation and description of mountains, though some of the most fixed and important features of nature, and distinct and appropriated appellations for their chains and branches, remain grossly defective in other provinces of European geography, it is not a subject of surprise that great obscurity should be found even in the classical regions, which now form a part of the Turkish empire.*

From the western extremity of the Hæmus seem to branch off two other extensive chains; one running north-west between Dalmatia on the west and Bosnia and Servia on the east: while the other passing south forms the mountains of Albania and the west of Greece. The northern chain begins with the Scardus of the ancients, continued by the Bussinius and the Albius, an account of which more properly belongs to the Austrian dominions. The chain running to the south has many classical appellations, as the Acroceraunian, Pindus, &c. The east and south of Greece are also crowded with small chains of mountains, and solitary hills, such as Olympus, Ossa, Pelius, and others.

Athos. Mount Athos, a detached summit in the north-east, is of considerable height, but has chiefly attracted observation from its singular form, so much resembling that of Montserrat in Spain; and from the many monasteries and churches on the declivities of its picturesque pinnacle.

Forests. There are considerable forests in various parts of European Turkey; but travellers have not distinguished them by particular descriptions.

Botany. While all the Christian countries of Europe have been surveyed with more or less accuracy either by the independent zeal of their native naturalists, or under the honourable patronage of their respective governments, the Turkish empire, containing the most celebrated and beautiful provinces on the face of the earth, has been almost wholly excluded from the researches of modern botanists. That jealousy of strangers, the result of conscious weakness in the government, and of profound ignorance and the meanest superstition in the people, which has uniformly characterized the Ottoman domination, has prevented those visits to Greece and the provinces south of the Danube which the memory of their ancient glory, and the pure love of science and nature, would have induced. Hence it is that the flora of European Turkey remains in so miserably imperfect a state. The distant regions of India, Japan, and Australasia, the sultry deserts

* Among the few travellers who have visited parts of mount Hæmus, is Dr Brown. See his Travels, London, 1673, 4to. p. 44, &c. He only observes that one of the minerals is talc; and that the chain is supposed to extend from the Euxine to the Adriatic. As no summit of the Hæmus seems covered with perpetual snow, the elevation cannot be considerable.

beyond the Cape of Good Hope, the pestilential swamps of America, and the forlorn expanse of Siberia, have been penetrated by the indefatigable zeal of the Linnæan school; their animals, minerals and vegetables, have been in a considerable degree described and arranged; while the cradle of civilization, the birth-place of those arts and sciences that have raised the nations of Europe to so proud an elevation above the rest of the world, has been trodden for ages past by barbarian feet. The vegetable tribes that clothe the rocks of the Cretan Ida, and shade the summits of Athos and Oeta, that adorn with their varied tints the vale of Tempe and the plains of Thessaly, that bask on the sunny shores of the Ægæan, or rise in stately luxuriance on the banks of the majestic Danube, succeed to each other, generation after generation, unknown and unregarded. A few hasty gleanings, chiefly from the maritime parts, have been brought home by travellers; but of the botany of the interior, especially of those provinces which lie between the Danube and the Archipelago, we are almost wholly ignorant.

The forests of Greece, the Greek islands, and the provinces bordering the Archipelago to the north, consist of the common and yew-leaved fir, the larch, the cedar, the ilex, the kermes oak, the common oak, the oriental plane-tree, the maple, the sycamore, the walnut, the chesnut, and the beech. The principal fruit trees are, the olive, *olea Europæa*, considerable forests of which, mixed with the broad-leaved myrtle, *myrtus communis*, adorn the shores of Crete and Attica; the orange, *citrus aurantium*; the fig, *ficus carica*; the vine, *vitis vinifera*; the pistachia tree, *pistachia lentiscus*; the mastich tree, *pistachia terebinthus*; the mulberry, *morus niger*; and the pomegranate, *punica granatus*. Of the shrubs and smaller trees the most worthy of notice are the bay-tree, *laurus nobilis*; the laurel, *prunus laurocerasus*; two kinds of *arbutus*, the *A. unedo*, and *A. andrachne*; the cypress, *cupressus sempervirens*; the rose laurel, *nerium oleander*; and the caper bush, *capparis spinosa*. A large proportion of the soil in Greece and the Greek islands being calcareous, either of the purer kinds, as marble and lime-stone, or of the mixed, as effervescent trap, a large proportion of the Greek flora in its present imperfect state, consists of those plants that are peculiar to lime-stone districts; the lower accessible ridges in Crete are principally marble and other calcareous rocks, hence this island has always been celebrated for its vegetable productions; of which the following are the chief, and all of them indicative of a calcareous soil; *stachys Cretica*, Cretan woundwort; *acanthus carduifolius*, thistle-leaved acanthus; *Cichorium spinosum*, thorny succory; *origanum Creticum*, Cretan origany; *origanum Dictamnus*, Cretan dittany; *astragalus tragacantha*, tragacanth vetch, from which the gum of this name is procured; *salvia pomifera*, apple sage; *cistus ladaniferus*, ladanon cistus; an elegant shrub, from the leaves and tender stalks of which the fragrant gum ladanon exudes; this is collected by whipping the plants with leathern thongs to which the gum adheres, and off which it is scraped from time to time.

A few other plants remain to be mentioned, which are natives of the Archipelago and the vicinity of Constantinople. These are *gossypium herbaceum*, herbaceous cotton; *dianthus fruticosus*, shrubby pink; *scro-*

phularia lucida; catananche Græca; achillea Ægyptiaca; asparagus aphyllus; lichen parellus, from which the beautiful crimson pigment called archil is prepared; *origanum Tournefortianum; cheiranthus farsetia; campanula laciniata; verbascum sinuatum; borago orientalis*; and *symphytum orientale*.

Zoology. The zoology of European Turkey presents few peculiarities. The jackal, frequent in Africa and Asia, is not unknown in these regions; and among the beasts of burden must be classed the camel. The Turkish horses are celebrated for spirit and form; and those of Walachia deserve particular praise. Of cattle and sheep there is little deficiency, but the particular breeds or qualities have been little explained. The sheep, distinguished by the name of Walachian, have spiral horns of singular elegance; but the fineness of the fleece would be a more useful distinction.

Mineralogy. The mineralogy of these provinces is also a barren field, for the indolence and ignorance of the Turks have generally neglected this branch of opulence; though from the mines in the adjacent regions of Hungary and Transylvania, and from the ancient accounts, there would be room to expect great mineral treasures. The gold mines of Philippi, about eighty miles to the east of Salonika, in the time of Philip of Macedon, produced yearly about 1000 talents, 2,880,000*l*. sterling: and silver mines were found in Attica, and other quarters.

Mineral Waters. The mineral waters are little known or celebrated; and the natural curiosities in the northern parts and around mount Hæmus, remain undescribed.

Natural Curiosities. Among those in the south may be named mount Athos, which, as already mentioned, rises in a conical summit, about 3,300 feet, grotesquely adorned with churches and monasteries. The grotto of Antiparos, one of the Cyclades to the west of Paros, has been well described by Tournefort, and recently by an ingenious female traveller.* The isle of Antiparos is a rock of fine marble, about sixteen miles in circumference. In the southern part of this isle, about a mile and an half from the sea, rises a rugged cavern with some ancient inscriptions. After proceeding about twenty paces appears a dark and low passage, whence the traveller, being provided with lights, descends by a rope, and afterwards by a ladder placed by the side of deep abysses. The path now becomes more easy, and conducts to another steep precipice, which is descended by another ladder. After much fatigue, and some danger, the traveller at length arrives in the grotto, which is supposed to be about nine hundred feet from the first opening.† Tournefort estimates the height of the grotto at about forty fathoms. The stalactitic marble hangs from the roof, in the most elegant and picturesque forms: and on the floor are large masses of stalagmite, brownish and less pure, produced by the liquified stone dropping from above; but Tournefort, a botanist, very naturally supposes that they vegetate.‡ A great distinction between this grotto

* Lady Craven.

† But this must include all the windings, for Lady Craven computes the direct distance at only 300 feet, p. 247.

‡ Vol. i. 148.

and others of a similar kind in England and other countries, is the purity of the material, being marble of a snowy whiteness, and the finest calcareous spar. The marble of Paros has been known and celebrated since the classical times, as the most pure that the sculptor can employ: but some prefer that of Carrara as of a finer and closer grain, and more obedient to the chisel, the Grecian having a large crystalline grain, apt to slit off more largely than required.

ISLANDS BELONGING

TO

TURKEY IN EUROPE.

THE numerous islands in the Archipelago are by geographers considered as belonging to Europe; except a few which approach the Asiatic shore, as Mytilene, Scio, Samos, Cos, and Rhodes.

The classical islands of ancient Greece have been so repeatedly described, that little more than an enumeration may suffice. The largest is that of Crete, or Candia, which is about 180 British miles in length, by forty at its greatest breadth. A chain of high mountains, called the White Mountains from the snow, pervades a great part of its length.* The inhabitants are vigorous, and robust, and fond of archery. This isle bounds with cattle, sheep, swine, poultry, and game, all excellent; and the wine is balmy and luscious. The dogs of Crete are ugly; and seem to be between the wolf and the fox. The siege of Candia by the Turks, in the middle of the seventeenth century, is remarkable in modern history, as having continued for twenty-four years, 1646—1670. This island had before flourished under the Venetians.

Next is Negropont, about 100 British miles in length by twenty in breadth; a large and important island, which also belonged to the Venetians to a late period.†

The other isles are generally of a diminutive size; and were divided by the ancients into separate groups, of which the Cyclades were the most memorable; while the Sporades approached the Asiatic shore.

* Tournefort, i. 69. &c.

† The isles of Corfou, Cefalonia, and Zante, on the other side of Greece, were on the fall of Venice seized by the French; but now constitute an independent republic, under the protection of Russia; a curious experiment on the genius of modern Greece.

Other chief names are Lemnos, Skyro, and Andro. It is unnecessary to give a tedious repetition of the births of illustrious classics, and other trivial particulars concerning these islands; and the grotto of Antiparos is described in the account of natural curiosities. It must not however be omitted, that in the year 1707 a new island arose from the sea, with violent volcanic explosions, near Santorine, and about a mile in diameter.* The other islands shall be briefly described under their proper division of Asiatic Turkey.

* The curious reader may find a long detail of this singular event in Payne's Geographical Extracts, p. 252 to 256.

HOLLAND.

CHAPTER I.

HISTORICAL GEOGRAPHY.

NAMES.—EXTENT.—BOUNDARIES.—ORIGINAL POPULATION.—PROGRESSIVE GEOGRAPHY.—HISTORICAL EPOCHS AND ANTIQUITIES.

NAMES. THE Seven United Provinces were, in ancient times, chiefly possessed by the Batavi, a people highly celebrated by Tacitus: but the boundaries being modern, there is no ancient appellation which particularly denotes this country. It is commonly styled the republic of Holland, from the name of a chief province; so called from the German word *Hohl*, corresponding with the English word hollow, and implying a concave or very low country. The people are called Dutch from the German *Deutsch*, or *Teutsch*; but *Deutschland* properly signifies the vast extent of Germany itself, though by the English restricted to a small portion using a dialect of the German language.

EXTENT. These provinces extend from the north of Groningen, to the southern boundary along Austrian Flanders and Brabant, about 150 British miles; and in breadth, from what is called the North Sea to the circle of Westphalia, about 100 British miles. The number of square miles is computed at 10,000.

ORIGINAL POPULATION. The original population appears to have been Celtic: but when the Romans conquered this country, the chief inhabitants were the Batavi, the most northern people of Belgic Gaul, and incontestibly a German or Gothic progeny. The Franks

passed the Rhine to the south of the Batavi; who appear to have been secure in their marshes and islands, till the Frisians, the next adjacent people in the north, in the seventh century extended themselves even down to the Scheld. In the eighth century the Frisians were subdued by the Franks under Charles Martel; but the Frisians and Franks may be regarded as mingled in the population with the ancient Batavians.*

Progressive Geography. The progressive geography of this region becomes curious and interesting, from the singular phenomenon of the increase of the sea. Upon inspecting the accurate maps of the ancient and middle geography of Gaul by D'Anville, it will be perceived that the Rhine divided itself into two grand branches at Burginasium or Schenk, about five miles north-west of the Colonia Trajana, now an inconsiderable hamlet called Koln near Cleves. The southern branch joined the Meuse at the town of Mosa or Meuvi; while the northern passed by Durstadt, Utrecht, and Leyden, into the ocean. From the northern branch was led the canal of Drusus, which originally joined the Rhine to the Issil, a river that flowed into a considerable inland lake called Flevo, now a southern portion of the Zuyder Zee. This canal of Drusus being neglected, and left to the operations of nature, the Rhine joined the Issil with such force that their conjunct waters increased the lake of Flevo to a great extent: and instead of a river of the same name, which ran for near fifty Roman miles from that lake to the sea, there was opened the wide gulf which now forms the entrance. This northern and chief mouth of the Rhine was, at the same time, weakened and almost lost by the division of its waters, and even the canal of Drusus was afterwards almost obliterated by the deposition of mud in a low country, in the same manner as some of the ancient mouths of the Nile have disappeared in the Delta of Egypt.

The southern branch of the Rhine, which flowed into the estuary of the Meuse, as above mentioned, was anciently called Vahalis, a name retained in the modern Waal; the ancient isle of the Batavi being included between the two branches of the Rhine, and thus extending about 100 Roman miles in length by about twenty-two at the greatest breadth. The estuaries of the Meuse and the Scheld have also been opened to great inroads from the ocean; and the latter in particular, which anciently formed a mere delta, with four or five small branches, now presents the islands of Zealand, and the most southern of those of Holland, divided by wide creeks of the sea. This remarkable irruption is supposed to have happened at the time that the Goodwin Sands arose, by the diffusion and consequent shallowness of the water. These great changes may be conceived to have made a slow and gradual progress; and none of them seem so ancient as the time of Charlemagne. Some of them are so recent as the fifteenth century; for in 1421 the estuary of the Meuse, or Maese, suddenly formed a vast lake to the south-east of Dort, overwhelming seventy-two large villages, with 100,000 inhabitants, who perished in the deluge.†

* D'Anville Etats Form. en Europe, p. 26.

† Cluver. 96. Guicciardini, 271. Some authors arbitrarily assign these changes to violent tempests, A. D. 860; others to 1170. Guicciardini p. 13.

By a subsequent change the Rhine was again subdivided; and a chief branch fell into the Leck, which joins the estuary of the Meuse between Dort and Rotterdam, and must now be regarded as the northern mouth of that noble river; while the Vahalis or Waal continues to be the southern: both branches being lost in a comparatively small stream, the Meuse. The less important variations in the geography may be traced with some precision in the Francic historians, and other writers of the middle ages.

HISTORICAL EPOCHS. Among the chief historical epochs may be numbered,

1. The actions of the Batavi in the Roman period, from the first mention of that nation by Julius Cæsar.

2. The conquest by the Frisians; and afterwards by the Danes, and by the Franks.

3. The countries watered by the Meuse and the Rhine were for a long time divided into small earldoms; but in the year 923 Theoderic or Diedric, brother of Herman duke of Saxony, and of Wickman earl of Ghent, was appointed count of Holland by Charles the Simple, king of France, and the title became hereditary. Zealand and Frisland were included in the donation. The county of Gelderland on the east was erected by the emperor Henry IV, in 1079; and became a duchy in 1339. Utrecht was subject to its powerful prelates, who had frequent contests with the earls of Holland.

4. Florence III, who succeeded in 1187, carried on numerous wars against the Flemings and Frisians; and died at Antioch, in 1189, on an expedition to the Holy Land. He married Ada, grand daughter of David I, king of Scotland, a country which had early commercial connexions with Holland. In 1213 William I, earl of Holland, formed a league with John, king of England, Ferrand, earl of Flanders, and the Emperor Otho, against France; but William was taken prisoner at the famous battle of Bouvines.

5. William II, earl of Holland, was elected by a party, emperor of Germany, A. D. 1247; but his claim was not crowned with success. John earl of Holland, A. D. 1296, wedded Elizabeth daughter of Edward I, of England. Frequent contests appear between the earls of Holland and those of Flanders, concerning the possession of the islands of Zealand. Philipina, daughter of William III, earl of Holland, is married to the Prince of Wales, afterwards Edward III, of England, a princess worthy of an heroic husband. This king afterwards contested the earldom of Holland with Margaret his sister in law. Jacquelin the heiress of Holland in 1417 wedded John IV, duke of Brabant; but her uncle John of Bavaria, who had resigned the bishoprick of Liege in the hopes of espousing her, contested the succession. A kind of anarchy following, Jacquelin went to England, where she married in 1423, Humphry, duke of Gloucester; and this marriage being annulled by the pope, she wedded in 1432, Borselen, stadtholder of Holland: and

A Zelandic chronicler, quoted by the same author, 346, says that the islands of Zealand were formed by violent tempests in the year 938, a date which seems to deserve the preference.

the next year was forced to resign her states to Philip the Good, duke of Burgundy.

6. Holland, with other large possessions of the house of Burgundy, fell by marriage to the house of Austria.

7. Holland, and some inferior provinces revolt from the tyranny of Philip II, in 1566; and in 1579 formed the famous union of Utrecht in strict alliance. The history of this interesting struggle has been depicted in glowing colours by the celebrated Grotius, who in this work sometimes rivals the acute brevity of Tacitus.

8. At the end of that century the Dutch had established colonies at the Cape of Good Hope, and in the East Indies; and settlements were afterwards gained in South America. During the seventeenth century they rivalled the English in the empire of the sea: and greatly exceeded them in commercial advantages. Their power began somewhat to decline after the obstinate naval conflicts in the time of Charles II. In 1672 Louis XIV invades Holland; and Amsterdam is only saved by opening the sluices.

9. William stadtholder of Holland ascends the throne of England 1688; and a stricter intercourse prevails between the two countries, Holland becoming the grand channel of the commerce of England with the continent.

10. The stadtholderate declared hereditary 1747. The war in 1756 opening great connexions between Holland and France, a French party began to form in the country, which opposed the stadtholder, who was supported by the English. In 1780 a war arose between Great Britain and Holland, which closed in 1784, after exposing to Europe the decline and weakness of the United Provinces, still further displayed by the entrance of the duke of Brunswick in 1788, who may be said to have subdued them without a blow.

11. The dutch having joined the coalition against the French their country fell a prey to the invaders, during the hard frost of the winter 1794-5; and the stadtholder took refuge in England in 1795. Though a separate government continue, yet the United Provinces must be considered as subject to France, which intends to incorporate the parts south of the Rhine. The Dutch fleet has since been nearly annihilated by the English.

Antiquities. The ancient monuments of the United Provinces are far from being numerous or interesting. The chief remain of the Roman period is the ruined tower near Catwick, about six miles north-west from Leyden, at the ancient mouth of the Rhine. This place is commonly called Brittenburg, and is supposed by some to have been erected by Caligula. An inscription evinces that it was restored by Severus. The Dutch antiquaries have published several inscriptions, engraved stones, little images, and other curiosities found in these ruins.* Some inscriptions have also been discovered in the territory of Nimeguen, and a Roman mile stone in the vicinity of Derft. In the middle of Leyden, upon an artificial hill, stands a round tower fabled to have been built by Hengist who first led the Saxons to England. Among the antiquities of the middle

* Junii Batavia, p. 200. Scriverius, 176.

ages may be particularly named the church of Utrecht, with a tower of great height, commanding as it were a map of the surrounding country, and worthy of the great power of the ancient bishops of that see. But Amsterdam itself, and most of the other cities, are comparatively of recent foundation, and contain but few monuments even of the middle ages.

CHAPTER II.

POLITICAL GEOGRAPHY.

RELIGION.—ECCLESIASTIC GEOGRAPHY.—GOVERNMENT.—LAWS.—POPULATION.—COLONIES.—ARMY.—NAVY.—REVENUES.—POLITICAL IMPORTANCE AND RELATIONS.

RELIGION. THE protestant religion, in the Calvinistic form, prevails through the United Provinces; and the treaty of Union 1579 bears that it shall be maintained. The states of Holland, in 1583, proposed that no other form of worship should be tolerated: but this resolution was wisely rejected; and every religion is permitted, on condition that it do not oppose the fundamental laws, or teach any doctrines subversive of the state; yet employments of any consequence can only be filled by protestants.*

ECCLESIASTICAL GEOGRAPHY. The ecclesiastical persons are considered as divided into four ranks, professors at universities, preachers, elders, and deacons: and the government of the church is administered by consistories, classes, and synods. The consistory is the lowest court, commonly consisting of the clergy and elders of a particular town, while a class consists of deputies from several, and is commonly assembled three times in the year, a part of its duty being to visit the churches, and watch over the conduct of the clergy. The synods are either provincial or national; the first being assembled every year, while the national synod is only summoned on the most important occasions, when essential doctrines are to be discussed, and the last was that of Dort, 1618. The provincial synods are:

	Classes.	*Preachers.*
1. That of Gelderland	9	285
2. That of Southern Holland	11	331
3. That of Northern Holland	6	220
4. The Congregation of Zealand	4	163
5. The Synod of Utrecht	3	79
6. That of Frisland†	6	207
7. That of Ober Yssel	4	84
8. That of Groningen, the city and low countries	7	161
9. That of Drent	3	40
Total	53	1570

* Busching, xiv. part ii. p. 16.

† That is Frisland proper. West Frisland is to the north of Holland on the west of the Zuyder Zee. East Frisland to the east of Groningen. See Nugent, ii. 381.

There are, besides, numerous Walloon churches, scattered through the provinces, who hold a kind of synod twice a year, composed of deputies from their own sect. The Roman Catholics are supposed to have 350 churches, served by 400 priests, exclusive of some in the conquered territory. The chief other sects are the Lutherans, the Remonstrants, or Arminians, who have forty-three teachers, Anabaptists, and Jews, and a few Quakers.

GOVERNMENT. The United Provinces were composed of seven republics, each retaining its own states, consisting of nobles, and burgesses. The provincial states send deputies to the states-general, each republic having only one vote, though its deputies may be numerous. But the states-general seldom exceed twenty-six persons, who used to assemble in a small room at the Hague, enjoying the right of peace and war, appointing and receiving ambassadors, naming the Greffier, or secretary of state, and all the staff officers.* The council of state directs the army and finances; and what is called the council of deputies considers the troops and finances of each province. The grand pensionary of Holland presides in the provincial states, and council of deputies of that country. The Stadtholder was originally a kind of dictator, appointed, from the necessity of the times, to conduct the emancipation of the state. The necessity having vanished, this office became of dubious authority, till William III, in 1672, procured it to be declared hereditary. As he died without children the states seized this power till 1747, when, the French penetrating into Dutch Flanders, the rank was restored to William IV, and again became hereditary, though in recent times frequently contested.

LAWS. Justice is administered according to the local customs and statutes of each province and city, the ordinances of the states-general, and in defect of all these the Roman code. Each province has a supreme court, to which appeals lie from the lower court of justice, except in criminal causes, in which the Stadtholder might pardon, by the consent of the president and superior court of each province, save in cases of murder and other flagrant crimes.

POPULATION. The population of the United Provinces has been recently computed at 2,758,632, and the extent of the territory in square miles being supposed 10,000, there will be 275 for each mile square. The population of Holland, the chief province, is calculated at 980,000.

COLONIES. The Dutch being, for a considerable time, the chief maritime power in Europe, their colonies were numerous; besides some settlements on the coast of Hindostan, and an important establishment in Ceylon, they held, and still retain Batavia, in the island of Java. But the Cape of Good Hope, and other considerable establishments have fallen into the hands of the English, and the Dutch colonies may be considered as nearly annihilated.

ARMY. The army was computed at about 36,000, but it is now incorporated with that of France. The navy, which used to consist of forty ships of the line, has by the events of the last war almost totally disappeared.

* Radcliffe's travels, i. 53. Busching, xiv. p. 40, &c.

Revenue. The revenue was about three millions and an half sterling, but was greatly exceeded by the expenditure; so that the national debt was computed at about 130,000,000*l.* sterling: but 2,800,000*l.* were annually received as the interest of loans to foreign powers.

Political Importance and Relations. The political importance and relations of the United Provinces are at present completely immerged in those of France. Any consequence among the European powers can scarcely be resumed, except by the hopeless union with the other Netherlands: but the most natural and necessary political relations are with England, under whose protection they might still have aspired to lucrative commerce.

CHAPTER III.

CIVIL GEOGRAPHY.

MANNERS AND CUSTOMS.—LANGUAGE.—LITERATURE.—EDUCATION.—UNIVERSITIES.—CITIES AND TOWNS.—EDIFICES.—INLAND NAVIGATION.—MANUFACTURES AND COMMERCE.

MANNERS AND CUSTOMS. A STRANGER visiting Holland, is surprised at the extreme cleanliness observable in the houses and streets; even hamlets, inhabited by poor fishermen, displaying a neatness and freshness, which forms a striking contrast with the squalid appearance of the German villages. The air being always moist, and commonly cold, the Dutch dress is calculated for warmth, and not for elegance. Yet the people are fond of splendid exhibitions, and remarkably submissive to their superiors*. The Dutch are of a phlegmatic temperament: and their courage at sea, is rather obstinacy than ardour, while, from the same cause, their labour is rather slow perseverance, than impetuous strength, like that of the English. In former times, their knowledge was chiefly restricted to two channels; affairs of state, on which, even the vulgar would converse with propriety; and the arts of getting money. But, as usual, in the decrepitude and fall of a state, as well as in the old age of the individual, the miserable love of money at length supplanted every noble thought and generous feeling. This striking characteristic has impressed every spectator, from the days of Ray the naturalist, who visited Holland in 1663, even to the present hour. A late amiable traveller observes that "the infatuation of loving money, not as a mean, but as an end, is paramount in the mind of almost every Dutchman, whatever may be his other dispositions and qualities; the addiction to it is fervent, inveterate, invincible, and universal, from youth to the feeblest old age"†.

The Dutch are commonly low in stature, and the women are taller than the men. The sex having generally few personal advantages, they are induced to make advances, which impress foreigners as immodest and improper. The Dutch dress is little affected by fashion, and the women retain the old broad hat, while that of the men is narrow and compact; nor has the ancient female affection for gold and jewels been eradicated by the avarice of fathers and husbands. The use of salt and high-seasoned food is, perhaps, enforced by the humid climate, as well as that of spiritous liquors. Besides the usual games

* Ray, 53. † Mrs. Radcliffe, i. 98.

the chief amusements were the theatres and the tea-gardens. The opulent merchants delighted in their villas, thickly planted among the numerous canals: and the smallness of the gardens was compensated by the richness of the miniature collection, in which, perhaps, one tulip root might cost fifty guineas. The Dutch perseverance is also displayed in the improvement of hyacinths, and other flowers, cultivated with great attention, because there was not room for the grander vegetables. In the winter, skating was also a favourite amusement, and the canals were crowded with all ranks, from the senator to the milk maid with her pail, and the peasant with his eggs. But the chief amusements in so moist a climate, were under the shelter of the domestic roof, in large and expensive collections of paintings and prints, which also became an article of commerce and avarice.

LANGUAGE. The Dutch language is a dialect of the German, and the Lord's Prayer runs in the following terms:

Onse Vader die daer zijt in de Hemelen. Uwen Naem word gheheylight. U Rijcke kome. Uwen Wille gheschiede op der Aerden, gelijk in den Hemel. Ons dagelijcks Broodt gheeft ons heden. Ende vergheeft ous ouse Schulden gelijk wy oock ouse Schuldenaren vergeven. Eude en leyt oas niet in Versoeckinge. Maer verlost ons vauden Boosen. Amen.

LITERATURE. The literature of the Seven United Provinces, is more respectable than that of the other Netherlands. Not to mention the ancient chronicle of the church of Utrecht, written by Beka in the thirteenth century, and other ecclesiastical productions of the middle ages, the great Erasmus, the restorer of letters in western Europe, was born at Rotterdam in 1467. Johannes Secundus, or Hans de Twede, one of the most elegant of modern Latin poets, was a native of the Hague, as the renowned Grotius was of Delft. Boerhaave, the celebrated physician, was born at Voorhoot near Leyden. Dort produced Paul Merula, a distinguished antiquary, who, at the beginning of the seventeenth century, first discriminated the real origins of European nations. Adrian Junius, or Yung, who explored the antiquities of his native country, was of Hoorn on the Zuyder Zee. Among other eminent names may be mentioned Meursius of Lausden, Dousa of Leyden, Heinsius of Ghent, and the younger Vossius, for the father was of Heidelberg. Hoogeveen of Leyden died in 1794, after having acquired the reputation of being the first Greek scholar in Europe. This list may be easily increased; but it shall suffice further to observe, that the native literature has not been entirely neglected, since the time of Catz the poet, a native of Zealand, who flourished in the middle of the seventeenth century; and that several works of utility and amusement have been published in the Dutch language, which ought to share with the German, the attention of lovers of literature.

EDUCATION. The mode of education pursued in these provinces seems to have been greatly inferior to that used in Scotland, a country enjoying an ecclesiastic government somewhat similar. The Dutch youths being chiefly allotted to a seafaring life, there was not, indeed, that opportunity for numerous parochial schools, and consequent diffusion of common knowledge, which took place in Scotland.

The most large and celebrated Latin schools were at Rotterdam, Breda, Middleburg, Groningen, &c.

UNIVERSITIES. The universities are five; Leyden, Utrecht, Harderwyck, Franecker, and Groningen; with two inferior colleges at Amsterdam and Deventer. There is an academy of sciences at Haarlem.

CITIES AND TOWNS. Amsterdam, the chief city of Holland, upon the small river Amstel, is first mentioned in the thirteenth century; but in the fourteenth, was reckoned among the commercial towns of Europe. About the middle of the seventeenth century, during the highest prosperity of the republic, it was enlarged by about one half. The haven is not distinguished by natural advantages, but has been improved and secured by art: and the wide forest of masts impressed every traveller with amazement. The population is computed at about 212,000. The streets are generally narrow, and the canals feculent. The houses have the common air of neatness peculiar to those of the Dutch. The chief edifices are the state house, founded on piles at an immense expense; the exchange, and the post office: but some streets along the chief canals display houses of uniform grandeur. Some agreeable walks occur in the interior of the city; but the environs are chiefly visited by water; yet to the south, there is an agreeable road to Ouderkirk, through pleasant gardens and groves*.

LEYDEN. Leyden is esteemed the next city in population, containing about 50,000 souls. It is the Lugdunum Batavorum of antiquity, and is distinguished by its university. Here the ancient Rhine almost expires in a number of small channels, which are passed by so many bridges, that the number has been computed at more than one hundred. The meadows and gardens around Leyden are remarkably productive, and there is a daily intercourse, by canals, with the other chief cities and provinces. The fair is still much frequented; but the university has declined under some commercial regulations, for the Dutch always wish to oblige strangers to leave as much money behind them as possible†.

ROTTERDAM. Next in population is Rotterdam, of about 48,000 people. There is a noble quay, with houses as handsome as any in the squares of London: and the great length of the streets is characteristic of Dutch cities, and even towns; yet they are generally narrow, and the foot pavement is only distinguished by a clean line of bricks‡. In the market place stands the well known statue of Erasmus. The canals, terraces, and draw-bridges are engaging objects; but there is little of real elegance, and the Dutch idea of beauty, is what we style prettiness. Yet where this prettiness leads to extreme neatness, it is preferable to squalid grace.

HAARLEM. Haarlem is computed to contain 40,000 souls; and, like Leyden, is fortified by old brick walls, the modern plan of earthen barriers, in which the cannon balls sink innoxious, being little known till towards the middle of the seventeenth century. The great church is esteemed the largest in the province of Holland; but the

* Radcliffe, i. 108. † Ibid. i. 89. ‡ Ibid. i. 16.

celebrated organ is more remarkable for power than sweetness. The house of Lawrence Coster, whom the Dutch fondly assert to have been the inventor of the grand art of printing, stands near the church; but impartial inquirers have decided the question in favour of Mentz.

HAGUE. The Hague is only esteemed a village, though the inhabitants be computed at 36,000. The court, or palace, contains several chambers allotted to the different branches of government, besides the apartments of the Stadtholder. The states-general meet in a room which contained twenty-six chairs, for the usual number of the members*. The cabinet of natural history has been carried to France, and probably the most curious books and pictures. It is asserted, that the Hague contains more magnificent houses, than occur in the like space, in any city in northern Europe. On the north of the town is a noble grove, with alleys of oak and beech, leading to the Maison du Bois, a palace of the Stadtholder: but the pleasantest road is that to Schevening, a village on the shore, two miles to the north-west, through four rows of lofty elms. The Hague is distinguished by its pleasant situation, and tranquil grandeur.

Middleburg in Zealand is supposed to contain 30,000 inhabitants; and it has a large town house, decorated with statues of the ancient earls and countesses of Holland. It was not only the seat of the provincial states, but also of the council of Flanders, presiding over part of that country acquired by the Dutch. Utrecht, Delft, Dort, and Groningen, are supposed each to contain about 20,000 inhabitants: and among the inferior cities may be named Maestricht, the most southern of the Dutch possessions, situated on the river Maese, or Meuse, eighteen British miles north-west of Aken, or Aix la Chapelle, and ceded to the Dutch, after repeated contests, by the peace of Nimeguen 1678: in the vicinity are vast stone quarries supported by numerous pillars, which might shelter thousands from the horrors of war.

INLAND NAVIGATION. To enumerate the canals of the United Provinces would be infinite, for they equal the roads in other countries; and the advantage must be the more perceived, during the interruption of maritime commerce, by the increase of the inland trade with Germany, the southern Netherlands, and France.

MANUFACTURES AND COMMERCE. The chief manufactures of Holland, are linens, many of which, however, are made in Silesia; pottery, and painted tiles, especially at Delft; leather, wax, snuff, sugar, starch, paper, besides some of woolen, cotton and silk†. But the most precious branch of commerce consisted in spices and drugs, brought from the settlements in the East Indies; and the Dutch East India company was, for a considerable time, the greatest mercantile firm in Europe. The fishery in the northern seas, and even on their own and the English coasts, was also an object of great commercial importance. Latterly, perhaps, the chief advantage was derived from Holland, being the grand deposite of commerce, between Great Britain and the continent, particularly Germany and France. The inland trade with Germany, by the canals and the Rhine, is almost the only branch which has escaped the ravages of war, and may, even now, be

* Radcliffe, i. 40. † Marshal, vol. i. 225—255.

regarded as considerable. Of this, the most remarkable feature consisted in the vast floats of timber, which arrived at Dort, from Andernach, and other places on the Rhine, whose copious stream received the trees of the German forests. The length of these rafts is from 700 to 1000 feet, the breadth from fifty to ninety; and 500 labourers direct the floating island, which is crowned with a village of timber-huts for their reception. The navigation is conducted with the strictest regularity; and, on their arrival at Dort, the sale of one raft occupies several months, and frequently produces more than 30,000*l.* sterling*. The other branches of inland traffic are numerous: and the Rhine may be said to supply Holland with insular advantages, secure from the destructive inroads of maritime war.

* Radcliffe, ii. 114.

CHAPTER IV.

NATURAL GEOGRAPHY.

CLIMATE AND SEASONS.—FACE OF THE COUNTRY.—SOIL AND AGRICULTURE.—RIVERS.—LAKES.—MOUNTAINS.—FORESTS.—BOTANY.—ZOOLOGY.—MINERALOGY.—MINERAL WATERS.—NATURAL CURIOSITIES.

CLIMATE AND SEASONS. HUMIDITY and cold are the chief characteristics of the climate of the United Provinces. The general face of the country is that of a large marsh, which has been drained; the canals, and even the sea, looking pale and discoloured by mud; but the numerous and important cities and towns excite admiration, and the most dignified ideas of the wonderful powers of industry, which seems to have selected a chief seat amidst the greatest natural disadvantages. And even among these marshes, the eye is relieved by the groves, gardens, and meadows; and to the east of Utrecht the woods and hills gently swell towards Germany. Yet the east, even of Dutch Brabant is disfigured by the large morass of Peal, extending about thirty British miles in length: Over-Yssel, so called from its western boundary of the Issel, which received the canal led by Drusus from the Rhine, is almost wholly composed of enormous marshes and heaths; and the morass of Bourtang rivals that of Peal in extent. The northern provinces of Frisland and Groningen, (parts of the ancient Frisia, which included also the principality of East Frisland now belonging to Prussia,) present towards the south and south-east, extensive heaths; while the parts towards the sea rival the morasses of Holland. Thus, the whole country may be said to display an intimate combination of land and water; and the few elevations commonly consist of barren sand*.

The agriculture of such provinces cannot be expected to be considerable, the land being mostly under pasturage, except a few crops of madder and tobacco, which are cultivated with great predilection†. In the province of Gelderland, and the barony of Breda, there were waste grounds of some extent, over-run with broom and heath, the soil generally a black sand, which seem to have been neglected as approaching to the frontier. The pasturages in the north of Holland, especially

* It is somewhat remarkable that the Zuyder Zee should be frequently frozen, Nugent, ii. 385; probably owing to the shallowness of its waters.

† Marshall, i. 264.

those of Bemster, and in Frisland, supplied such quantities of excellent butter, as to become a staple article of commerce. The cows seem to have been originally from Holstein, and the utmost attention was paid to warmth and cleanliness, so that, even in summer the animals appeared in the meadows clothed with ludicrous care*. It was probably known from experience, that the climate was too moist for wheat, and too cold for rice; and pasturage being preferred to inferior crops, the small portion of fertile land, was divided into pasturage and gardens.

Rivers. The chief rivers of the United Provinces are the Rhine, and the Meuse: the latter here receiving at its estuary the Aa, joined with the Domel from the south: and from the north, that great outlet of the Rhine called the Waal: and near forty British miles further to the west, the second grand outlet of the Rhine, called the Leck, joins the Meuse, after which, but a small stream passes by Leyden to the German ocean. The principal river falling into the Zuyder Zee, is the Issel, which rises not far to the south-west of Munster, and, after receiving the canal of Drusus, near Duisberg, becomes a considerable stream. On the north of this is the small estuary of Wecht, which rises to the north of Munster. The rivers of Frisland and Groningen are so diminutive that they are mostly lost in the numerous canals before they join the sea.

Lakes. The lakes are of small extent, if we except what is called the sea of Haarlem, on the north of which is the Y, a broad piece of water, passing by Amsterdam, rather wearing the semblance of a creek of the sea, than of a river; and even the Meer of Haarlem can hardly be regarded as a lake of fresh water. There are other small lakes in the north of Holland, and in Frisland and Groningen; not to mention some amidst the marshes of Over-Yssel.

Progressive Geography. Of mountains there is not the most distant semblance; and even the few hills towards the east, may more properly be denominated little elevated tracts of sand.

Botany. When it is considered that the Batavian territory is destitute of wood-lands, of mountains, and of lime-stone districts, it will easily be perceived in what respects its flora is inferior to that of Britain: we should search in vain among the swamps, the level meadows, or the sandy heaths of Holland, for the numerous species of orchideæ, and of papilionaceous plants that inhabit the beech-woods of Sussex, and Kent, or the open chalk downs of the southern and midland counties, and though the bleak heaths of Gelder and Over-Yssel may furnish a few of our mountainous plants, such as the arbutus uva ursi, and vaccinium vitis idæa; yet those that dwell by the rushing torrents of Wales and Scotland, that fix themselves to the rocky bottom of our pellucid lakes, or flourish in the cloudy solitude of Snowden, of Skiddaw, or of Ben Nevis, are wholly wanting in the list of indigenous Batavian vegetables. The only plants possessed by Holland, which are not found in the British islands are, Isnardia palustris, trapa natans, calla palustris, vallisneria spiralis, all aquatic plants, and natives of the Rhine, and other waters in the province of

* Marshall, i. 37.

Holland; and veronica peregrina, globularia vulgaris, campanula persicifolia, ornithogalum minimum, and oenothera biennis, *evening primrose*, growing on the frontiers of Brabant and Westphalia.

Zoology. In the zoology of the United Provinces there is nothing peculiar, or worthy of remark; the horses are chiefly from England and Flanders, the oxen from Holstein. The stork is here frequent, though unknown in England. The shores abound with excellent fish, particularly turbot and soles; but the herrings, a favourite food, are derived from the northern ocean, and are chiefly brought to Flardingen, or Vlaerdingen, a port on the west of Rotterdam, so noted in ancient times, that the earls of Holland are first mentioned by the style of earls of Flardingen.

Mineralogy. Minerals are unknown, if we except the slight incisions for peat; and the land being mostly alluvial, it is scarcely possible that any metals, or even coal, should be found. In digging a well near Amsterdam, sea-sand was discovered at the depth of more than 100 feet, a proof that in primitive ages the land had encroached upon the sea, which afterwards resumed a part of its rights. On the other hand, in digging the marshes, trees have been found at a considerable depth, often with their heads towards the east, as if they had yielded to the fury of the western winds. The umber or ligneous earth, sometimes used by the Dutch to adulterate their snuff, is not a native product, but is brought from the vicinity of Cologne, where it occurs in vast beds, and is sometimes even used for firing. The Dutch not only procure peat from their morasses, but also from the bottoms of the rivers, by dragging up the mud, which is exposed to dry on the shore, then cut into small pieces, and again dried for use. No mineral waters are here known, and there are few uncommon appearances of nature, though the whole country may be deemed an artificial curiosity, from the number of canals, and from the vast dykes erected to exclude the sea. These are often protected by a covering of rushes, strongly fastened with wood; yet sometimes dreadful inundations have taken place, an evil which long experience seems latterly to have taught them to prevent.

DENMARK.

CHAPTER I.

HISTORICAL GEOGRAPHY.

NAMES.—EXTENT.—BOUNDARIES.—ORIGINAL POPULATION.—PROGRESSIVE GEOGRAPHY.—HISTORICAL EPOCHS AND ANTIQUITIES.

NAMES. THE name of Denmark, implying the marches, boundaries, or territories, of the Danes, is derived from the inhabitants, who are said to have been so denominated from one of their first leaders called Dan. Such etymologies are always uncertain: and even when clear, the knowledge acquired is of no importance. The people are mentioned by the name of Danes in the sixth century, when we first begin to acquire a faint idea of Scandinavia, from the history of Jornandes. Norway, anciently Norrik, or the Northern kingdom, affords a palpable and precise derivation.

EXTENT. These kingdoms, which, in former times have, by repeated emigrations, changed the destinies of a great part of Europe, and continue deeply to interest the student of history, constitute a singular expansion of territory. For, from the river Elbe, in the south, to the northern extremity of Danish Lapland, and the wild environs of the river Tana, may be computed, after excluding the entrance of the Baltic, an extent of not less than 1400 British miles in length, by a medial breadth of only 150. Of this great length Denmark occupies about 260 miles, while the remainder belongs to Norway. This extent of coast might be supposed to constitute a formidable naval power; but unfortunately the havens are neither numerous nor important,

and are better adapted to the fleets of small vessels, which formerly struck Europe with dismay, than to the pomp and magnitude of modern navigation.

BOUNDARIES. To the south, the Danish province of Holstein, borders on the wide territories of Germany; on the east, west, and north, Denmark is surrounded by the sea. The eastern limits of Norway are chiefly indicated by a long chain of mountains, passing between that country and Sweden.

ORIGINAL POPULATION. The original population of Denmark appears to have consisted of Cimbri, or northern Celts, the ancestors of our Welch; and who, in particular, held the Cimbric Chersonese, or modern Jutland and Sleswick. On the progress of the Goths from the north and east, the Cimbri were expelled: and being joined by part of the Teutones, or more southern Germans, they were in quest of other possessions, when they were defeated by Marius. Yet the Chersonese continued to retain their name; and Tacitus mentions, that in his time there existed a small state of the Cimbri, probably near the mouth of the Elbe, while the remainder of the Chersonese was possessed by seven Gothic tribes, among which he names the Angli, who afterwards gave appellation to England, and who appear to have resided in the eastern part of Sleswick, where there is still the province of Anglen. The original possessors of Norway, which, with Sweden, constitutes the ancient Scandinavia, appear to have been the Fins and the Laps, who were driven to the northern extremities by the Gothic invasion, allegorically said to have been conducted by Odin, the God of War. The population has since continued pure and unmixed by foreign conquests; and the Norwegians still retain the muscular frame, blooming countenance, and yellow hair of the Normans, so well known in France, Italy, and England.

PROGRESSIVE GEOGRAPHY. The progressive geography of Denmark, may be traced with some precision from the first mention of the Cimbric Chersonese by astonished Rome. Pliny supplies some omissions in the description of Tacitus, by mentioning the Sinus Codanus, or Baltic, and some bays and islands in this vicinity. Tacitus describes the *Suiones*, ancestors of the Danes, not of the Swedes, as imagined by careless geographers, as consisting of states situated in the sea, that is in the islands of Zeeland, and others which still form the seat of Danish power*. He adds, that they had fleets, their ships being of a singular form, capable of presenting either end as a prow; that they had acquired wealth, and were ruled by a monarch. The whole circumstances, as well as the course of the narration, might easily be shewn to apply to the Danes, and not to the Swedes who are the *Sitones* of that great writer. The progressive geography of Denmark may afterwards be illustrated from various passages, especially from Jornandes, and the Francic historians, till Adam of Bremen, in the eleventh century, gave a minute description of the country, and their own historian Saxo Grammaticus composed his classical work about the year 1180.

* Germ. c. 44.

The geography of Norway, as may be expected, is more obscure nor is there reason to believe that any part, except its most southern extremity, had been seen by the Roman mariners. It seems therefore, a vain conception, merely arising from similarity of names, to suppose that the Nerigon of Pliny is Norway; and to add to the absurdity, that the city of Bergen, which was only built about the year 1070, is the Bergos of that author! The passage belongs to his description of Britain*; and it would be more rational to inquire for these isles, (for he especially mentions Burgos as a separate isle,) among the Orkneys; or perhaps off the coast of Jutland, where it is well known that isles have been lessened and devoured by the fury of the western waves. In his attempt to illustrate this subject, D'Anville has sunk into the grossest absurdities; and his arguments are not only puerile, but he even corrupts the text of Pliny. Suffice it to observe, that he extends beyond all rational bounds, the ancient knowledge of Northern Europe; and supposes that the promontory of Rubeas, is the furthest extremity of Danish Lapland, instead of a cape in the north of Germany stretching into the Baltic! It is painful to observe so able a geographer following in this instance, the dreams of Cluverius and Cellarius, while he justly restricts the ancient knowledge of Asia and Africa. Few materials afterwards arise for the progressive geography of Norway, till the time of Jornandes; whose account is succeeded by the navigation of Ohter reported to the Great Alfred, and the description by Adam of Bremen.

Historical Epochs. The chief historical epochs of these conjunct kingdoms, must be separately considered till their union in the fourteenth century.

1. The most ancient population of the continental part of Denmark by the Cimbri, who probably possessed the adjacent large isles, the ancient and chosen seat of the Danish monarchy; but of this last position there is no evidence.

2. The conquest by the Goths, who appear to have proceeded from Scandinavia into the isles, and Jutland, as the dialect differs greatly from the German Gothic, while it is a sister of the Swedish and Norwegian.

3. The Roman and Francic accounts of Denmark, from the time of Pliny and Tacitus to that of Charlemagne.

4. The fabulous and traditional history of Denmark, which extends from about the year of Christ 500, to the reign of Heriold, mentioned by the Francic historians in the time of Charlemagne.

5. The conquest of Denmark by Olaf II, king of Sweden, about the year 900. The Swedes appear to have been expelled by the Norwegians, for we afterwards find Hardegon of Norway king of Denmark. The Danish antiquaries have not shewn much judgment in extricating the ancient history of their country, in which they should have preferred the Francic historians to the Icelandic Sagas. Some difficulties

* Lib. iv. c. xvi. *Britannia et Hibernia.* "Sunt qui et alias prodant, Scandiam, Dumnam, Bergos: maximamque omnium Nerigon, ex qua in Thulen navigetur."

indeed arise because Jutland and the isles were occasionally divided into two monarchies; but if the Danish writers showed as much acuteness as industry the embarrassments might disappear.

6. The more certain history commences with Gurm, or Gormo, A. D. 920, but there seems no evidence whether he sprung from a native race, or from the Swedish, or Norwegian. Gormo is succeeded by his son Harald Blaatand 945, who is followed by his son Swein 985, well known by his invasion of England, where he in some measure usurped the sovereignty, and died A. D. 1014.

7. The reign of Canute the Great, king of Denmark, England, and Norway. The conversion of Denmark to Christianity had commenced in the beginning of the ninth century, when St. Amsgar began to diffuse the light of religion in Jutland; and towards the middle of that century there were churches at Sleswick, and even at Arhus: but Christianity was far from being universal in Denmark till the reign of Canute the Great, when it was followed by its universal consequences, the cessation of piracy and rapine, and the diffusion of industry and civilization. In the year 1086 Denmark displayed to Christendom a regal saint, and martyr, in Canute IV.

8. The wars of Denmark with the Wends, or Slavonic inhabitants of the southern shores of the Baltic, who, by the ignorant historians of the middle ages, are styled Vandals, as the Gutæ of Ptolemy are by them styled Goths, whence the Swedish Gothland instead of Guthland.

9. The reign of Waldemar, surnamed the Great, A. D. 1157, who defeats the Wends in many battles, and subdues the isle of Rugen. Hence followed slowly the conversion of Pomerania, and of the countries on the east. Waldemar is regarded as the parent of the Danish laws. In 1223 the second Waldemar, with a fleet of 1000 ships, subdued a part of Livonia and Estonia; on which occasion is said to have been first displayed the noted banner of Dannebrog, being red with a white cross.

10. The marriage of Hakon VI, king of Norway, with Margaret daughter of Waldemar III, king of Denmark, A. D. 1363, produced the memorable union of the three crowns of the north. On the death of her young son, Margaret ascended the throne of Denmark and Norway in 1387, and that of Sweden in 1389. She died in 1412; and Sweden soon after prepared to throw off the yoke. Her husband, Eric of Pomerania, reigned about twenty-six years after her death; and was followed by Christopher of Bavaria, who removed the royal residence from Roskild to Copenhagen, the source of the elevation of the latter city.

11. The accession of the house of Oldenburg, in the person of Christiern I, A. D. 1448. The repeated revolts of Sweden were suppressed by his successor John, who was crowned at Stockholm in 1497, and the next year concluded an alliance with Louis XII of France, and James IV of Scotland. John had repeated wars with the Hanseatic league, which supported the Swedes against his authority.

12. The tyrannical and unhappy reign of Christiern II, when Sweden was emancipated by the efforts of Gustaf Wase.

13. The abolition of the Roman Catholic religion by Christiern III, 1537; but the Lutheran had been already introduced in 1526.

14. The reign of Christiern IV, who carries on unsuccessful wars against Austria and Sweden; the latter being continued by his successor Frederic III, who was constrained to sign a treaty in March 1660*, by which he abandoned to Sweden the valuable province of Scone, and other parts in the south of Scandinavia, which had long remained in the possession of the Danes, together with the fertile island of Rugen.

15. The memorable revolution of the 23d October 1660, by which the crown was declared absolute and hereditary. The subsequent events have been little memorable.

Of the Norwegian history, the chief epochs may be considered in the following order:

1. The original population by the Fins and Laplanders.

2. The conquest by the Goths.

3. Norway was divided into twenty, or more, petty monarchies, till the ninth century, being, as may be conceived, in a more savage state than Denmark and Sweden. From that singular and interesting work, the history by Snorro, which is chiefly that of Norway, it would appear, that the Norwegian monarchs sprung from the ancient royal family of Sweden. The sovereignty originally founded in the south-east part of Norway, around the modern city of Christiana, was extended by degrees, and Harald Harfagre about A. D. 910 became master of all Norway. During the contest, many discontented princes and nobles left the kingdom; and among others Ganga Hrolf, or Rollo the walker, so called, because no horse could support his weight, proceeded to France; where, in the year 912, the province afterwards styled Normandy, was surrendered to him and his warlike followers. The romantic successes of the Normans in England, Italy, and Greece, are delineated by the masterly hand of Gibbon.

4. The reign of Olaf I, when Norway and Iceland were converted to Christianity. Greenland had been discovered A. D. 982, by Eric the Red, and his attendants from Iceland; which island was itself peopled from Norway 874—880. In this reign of Olaf I, Vinland, or Wineland, a more southern part of North America, was discovered by Biarn, and by Leif, son of Eric the Red, A. D. 1003. The little colony, settled in Vinland about 1006, perished from intestine divisions. The country was so called from some wild grapes or berries; and is supposed to have been on the coast of Labrador, or more probably the island of Newfoundland. Currants, or small grapes, are indeed found

* Jemptland and Herndal, regarded as Norwegian districts, had been yielded to Sweden in 1645. Pontoppidan, and what is still stranger, Mr. Coxe, have in their maps extended Herndal or Haridal (Busching, i. 607.) across to the sea, while it is a small province to the south of Jemptland, on the east of the Scandinavian Alps. Of this strange mistake it appears, that Homann's map is the sole source; and his maps are indeed notorious for gross inaccuracy: nor was it in 1660, as the map asserts, that Herndal was yielded to Sweden. Consult the impartial testimony of the general map of Sweden by Hermelin, or in his Atlas, the particular map of the province of Herjeadalen. The detection of this great error, was necessary, as Mr. Coxe's Travels are deservedly in many hands.

as far north as the English settlements on Hudson's Bay; and the distance from the Norwegian settlement in Greenland to Newfoundland, might easily have been traced by a vessel running before the wind, as was the case. Yet Greenland alone would assign to the Norwegians the first discovery of America*.

5. The remarkable reign of Olaf II, the saint, 1014—1030. His second son, Harald III, aspired to the throne of England, and was slain in a battle against Harold king of England, on the 25th of September, 1066. This memorable conflict, which, by weakening the English force, led to the Norman conquest, has been hastily described by our historians, who have confounded this king, surnamed *Hardrad*, with Harald *Harfagre*, who reigned a century and a half before. The son and successor of this king founded Biorgen, or Bergen in 1069.

6. Magnus II, in the year 1098, subdued the Orkneys and Hebudes which had been subject to the Normans from about 850; but the earls had refused homage to the Norwegian kings.

7. The Hebudes, or Western Islands, was surrendered to Scotland, A. D. 1266, by Magnus V: but the Orkneys continued to be regarded as subject to Norway till the year 1468. Iceland, which had existed as an independent republic, about this time became subject to Norway†. Magnus V first instituted hereditary dignities; and imprudently excluded the deputies of the people, from the national assembly.

8. The final union of Norway with Denmark A. D. 1387; since which period, the events must be sought in the history of the latter kingdom.

ANTIQUITIES. The ancient monuments of Denmark and Norway are chiefly what are called Runic, though it be not clear at what period the use of the Runic characters extended so far to the north. Circles of upright stones are common in all the Danish dominions, in Holstein, Sleswick, Jutland, the Isles, Norway, and Iceland; in which latter country their origin is perfectly ascertained, as some were erected even in recent times of the Icelandic republic, being called Domhring, or Circles of Judgment. Some also appear to have been cemeteries of superior families. Monuments also occur of two upright stones, with one across; and of the other forms imagined by our antiquaries to be druidic. Since the conversion of these countries to Christianity, in the eleventh century, many churches were erected; among which are those of Bergen and of Drontheim, both built of stone in that century. The residences of the chiefs appear to have been generally constructed of wood; for there are few ancient castles to be found in Denmark or Norway. In Iceland there still exists a bath, built by Snorro the famous historian, in the thirteenth century; but the edifices were there also of timber, so that no remains can exist.

* It is singular enough, that while the Welch antiquaries deafen us with the imaginary discovery of America by Madoc, A. D. 1170, the Norwegians have been contented with a simple unpretending narration of the facts. Mr. Pennant has ironically observed, that his countrymen suppose that *penguin* derived its name from the Welch settlers, while that bird has a *black* head.

† Torf. Hist. Nor. iv. 334.

CHAPTER II.

POLITICAL GEOGRAPHY.

RELIGION.—ECCLESIASTIC GEOGRAPHY.—GOVERNMENT.—LAWS.—POPULATION.—COLONIES.—ARMY.—NAVY.—REVENUES.—POLITICAL IMPORTANCE AND RELATIONS.

RELIGION. THE religion of Denmark and Norway is the Lutheran. There is no archbishop; but the bishopricks are twelve, six in Denmark, four in Norway, and two in Iceland.

ECCLESIASTIC GEOGRAPHY. The chief see is that of Zeeland, which yields about 1000*l.* a year. The others are from 400*l.* to 600*l.*: the bishopricks of Skalholt and Holun in Iceland are only valued each at 150*l.*, but living is far cheaper in that island. The other clerical orders are provosts, or archdeacons, parish priests, and chaplains. The parochial clergy are maintained by their glebes, tythes, and surplice fees; but in Jutland some of the livings do not exceed 20*l.* a year*.

GOVERNMENT. Since the revolution of 1660, the Danish government has been an absolute monarchy. That revolution was produced by the obstinacy of the nobility, and consequent enmity of the clergy and burgesses, who perceived no other means of humbling their adversaries. As the northern nations are seldom deficient in good sense, we may conceive that theoretic reasonings on the subject are idle; and that as the nobility would make no concession whatever, there remained only the alternative of an absolute monarchy, or a civil war. At the same time, as the intentions of the clergy and burgesses were perfectly understood, and their original aim was to acquire a parity of power, it may well be regarded as extremely ungenerous in the monarchs, that they did not restore the national council, so constituted and balanced. It is, indeed, not a little remarkable, that, since that period, the genius of Denmark has ever yielded to that of Sweden, a proof, that an absolute sovereign, in fact, weakens his own power; for liberty is the parent of industry and exertion, and a free people can supply strength and resources to the throne, infinitely surpassing those of despotism.

* Riesbeck, iii. 101, gives a singular picture of the Danish parochial clergy, who are as much venerated by the people, as they were in Scotland, a century ago; but are orators of despotism, being held in strict bonds by the court.

LAWS. The Danish government has, however, been generally conducted with mildness and moderation: and their regal acts pass through many councils, who carefully observe the legal forms. The laws are chiefly comprised in the code of Christiern V, who reigned in the end of the seventeenth century. This code consists of six books: 1. on judgment and judges: 2. religion and religious orders: 3. civil and economical affairs: 4. navigation and maritime laws: 5. property: 6. crimes: forming only a small volume like the laws of Sweden, Russia, and Prussia, while in the south of Europe, a life might be consumed in perusing the laws of some of the states.

POPULATION. The population of the Danish dominions is computed at two millions and a half; though there seem little room to infer that it yields to that of Sweden. If we suppose the square contents to be about 180,000 miles, there will only be twelve inhabitants to the square mile. Norway is not supposed to contain more than 700,000 souls, nor Iceland above 50,000, the former only yielding six, the latter, one, to the square mile.

COLONIES. Denmark possesses some small colonies, as Tranquebar, on the coast of Coromandel, Christiansburg, on the coast of Guinea, a small part of Greenland, in America; with three islands in the West Indies, St. Jan, St. Thomas, and St. Croix, of which the latter was purchased from France in 1733.

ARMY. The army of this kingdom is computed at 70,000 men, of which Denmark supplies about 40,000, and Norway the remainder.

NAVY. The navy consists of thirty-three ships of the line, manned by about 11,000 seamen, and 5000 marines.

REVENUE. The annual revenue is computed at about one million and a half sterling, being superior to that of Sweden. Denmark contributes 543,554*l.*: Norway 290,000*l.*: Sleswick and Holstein 300,000*l.*: the West Indian Islands 262,000*l.*: the toll levied upon ships passing the Sound 122,554*l.*: Altona, 3,150*l.* The expenses of the state amount annually to about 1,050,000*l.*; and it is burdened with a debt of 2,600,000*l.**.

POLITICAL IMPORTANCE AND RELATIONS. Denmark and Norway have long ceased to be objects of terror to the southern powers, and centuries have elapsed since any of the monarchs has been distinguished in war, while the Swedes, on the contrary, have maintained their martial spirit. Christiern IV, whose long reign extended from 1588 to 1648, was the last of the warlike monarchs; and since that period the Danes have been vanquished in every contest, either in Sweden or Germany. The resources of the monarchy have also been weakened by its despotism; and Denmark is little regarded among the European powers. A timid policy has long united her in alliance with Russia, as a mean of security against Sweden; but more wisdom would appear in a firm alliance with Sweden† and Prussia against the exorbitant power of the Russian empire. To a nation at war with Prussia,

* Boctticher's Tables.

† It would be wise in both the Scandinavian sovereigns to abandon fabulous and interfering titles; and content themselves with the general style of Sweden and Denmark.

Denmark may constitute a valuable ally; but difference in religion, and other causes, have secured this state from the influence of Austrian policy. To France, it may be conceived, that Denmark would now prove a more useful and near ally than Sweden, the connexion with which kingdom was grounded on peculiar circumstances in the seventeenth century, before the dawn of Prussian greatness; and at present, hardly a case could be imagined in which Sweden could yield the smallest assistance to France. The natural and deep connexions between England and Russia, would on the supposition of a firm alliance against the latter power, of course estrange the former from Denmark.

CHAPTER III.

CIVIL GEOGRAPHY.

MANNERS AND CUSTOMS.—LANGUAGE.—LITERATURE.—EDUCATION.—UNIVERSITIES.—CITIES AND TOWNS.—EDIFICES.—ROADS.—INLAND NAVIGATION.—MANUFACTURES AND COMMERCE.

MANNERS AND CUSTOMS. THE manners and customs of the superior Danes, differ little from those of the same classes in other parts of Europe. To the disgrace of the government, the peasantry continue in a state of vassalage; except those of the crown, who have been recently delivered by the patriotism of the heir apparent, and a few other instances. They are of course, idle, dirty, and dispirited; while those of Sweden appear to have been always free; nor would it be easy to fix the period, when vassalage, so foreign to the nature of the northern governments, first began in Denmark. In addition to this radical cause of the want of national energy, property is ill divided; and the middle classes, especially that of yeomanry, the glory of England, are almost unknown. In Norway, on the contrary, every peasant breathes the air of freedom, except those of a few noble estates near Frederickstadt. "The benefits of the Norway code are so visible in its great effects on the happiness, and in the appearance of the peasants, that a traveller must be blind, who does not instantly perceive the difference between the free peasants of Norway, and the enslaved vassals of Denmark, though both living under the same government"*. Among the numerous inconsistencies of human nature it is indeed one of the most singular, that absolute monarchs should be anxious to improve the breed of their horses, and to debase that of their subjects. The able writer last quoted, proceeds to observe, that the Norwegian peasants are spirited, frank, open, and undaunted, yet not insolent; and, instead of the servile bow, they shake the hand of their superior or benefactor: in the comforts of life they seem to yield to none, except some of the Swiss: their usual dress is of a stone colour, with red button-holes, and white metal buttons; and the women often appear only dressed in a petticoat and shift, with a close collar round their throat, and a black sash. Their usual bread, like that of the Scottish peasantry, consists of flat cakes of oatmeal; and in times of great scarcity is mingled with the white inner rind of trees.

* Coxe, v. 9.

LAPLANDERS. At the furthest northern extremity of Norway is the region of Finmark, or more properly Lapmark, being a large province possessed by the Danish Laplanders, and extending even to the east of Cape Nord towards Russian Lapland. The inhabitants of this wild and remote province have been described at considerable length, by Leems, who has presented a complete and faithful picture of Laplandic manners.* This singular race of men are of a small size, generally about four feet, with short black hair, narrow dark eyes, large heads, and high cheek-bones, a wide mouth, and thick lips, and of a swarthy complexion. In the southern part of Finmark they are mingled with Norwegians; but the northern wilderness is wholly their own. They call themselves *Same*, their speech *Same-giel*, and their country *Same-Edna*, being probably of the same race as the Samoieds. The language has only an affinity with the Finnish, but not nearly so much as the Danish has with the German;† and it would seem that they had anciently a different speech, which they enriched with large additions from that of their more polished neighbours the Fins. Towards the shore they built huts; and on the mountains use tents of a singular form, being flatly conic, and divided into two parts by a kind of passage, each part having three rude subdivisions, only marked on the floor; the two furthest for the master, mistress, and guests; the middle, on each side of the fire, for the children: while those nearest the door are assigned to the servants; behind whom the cattle also find refuge, these being indeed few, while the rein deer form their chief wealth. The sun is here absent for seven weeks; yet from ten in the forenoon to one in the afternoon there is a kind of twilight even in the shortest days, so that one may read without a candle; but the stars are very visible, and the moon, when apparent, shines all the day. In return the sun never sits for seven weeks of summer; but his beams are dull and remiss in the night, when he assumes a ruddy hue. Several rivers, particularly the Tana, in eastern Finmark, which sometimes swells to a great height with the melted snows, supply salmon, and other fish, a considerable part of the Laplandic food; but at a festival are seen mutton, or rein deer, and mead. The men wear conic red caps, lined with fur, and a kind of robe of cloth or skin; the poor sometimes using that of salmon, which appears like a white shagreen: the head and neck are protected with a sort of cowl, and the vest is of undrest sheepskin, the wool inwards. The head-dress of the women is narrowed in the middle, whence it widens like a bason at the top; and the vest and robe resemble those of the men. Their amusements are shooting with the bow at a mark, a kind of tennis, and a game resembling draughts. They are also fond of wrestling, and other exercises‡. They were formerly addicted to magic, and were fabled by incantations to invoke a demon in the shape of a fly, which was called the *gan-fly*, and commissioned to sting their enemies. Till recent times they were immersed in paganism, regarding particular mountains and rocks as holy; their chief god was Radien, who dwelled

* Leemius de Laponibus Finmarchiæ. Copenhagen 1767, 4to. Scheffer treats of the Swedish Laplanders: of the Russian there seems no ample account.

† Leems, p. 11. ‡ Leems, 388.

in the starry heaven; in the lower aërial regions were Beivi or the sun, a god, as Grotius has observed, very unjust to them; with Horangalis or the thunderer, and other divinities. On earth were the gods of hunting and fishing; and the goddess Maderakko, with her daughter Sarakka, a kind of Venus, who prepared the body after Radien had sent the soul. The Saivo Olmak, or gods of the mountains, were supposed to be oracular. For a more full account of this mythology the reader is referred to Leems. The places of sacrifice were chiefly holy mountains near the firth of Waranger, and along the Tana, and some on the bay of Porsanger. Their magical drums and songs are already trivial.

Amidst the conversion of the northern nations to Christianity, the Laplanders had been unaccountably neglected. Eric Bredal, bishop of Drontheim, made some vain attempts about the year 1660; but the royal mission was not founded till 1714; and extended to the Laplanders of Finmark, with those of Norland to the south, being a considerable portion of the diocese of Drontheim. Since that period the missionaries have exerted themselves with great success; there being commonly two for Finmark, one for the east who presides over Waranger, Tana, and Laxefiord; the other for the west, over Porsanger, Hvalsund, and Alten*. Leems well delineates the hardships suffered by these missionaries; among which, the cold is so excessive that, when he was sitting near a strong fire, the wall behind would present his shade in thick hoar frost.

The manners and customs of the Greenlanders shall be considered in treating of North America. Suffice it, in the mean time, to mention that the curious canoes, only capable of containing a single person, and which are sometimes driven as far as the northern isles of Scotland, where they are said to belong to the Finlanders, are in truth only known in Greenland; whence they are driven by the violence of the western wind: nor is the distance greater from the south of Greenland, than from the north of Finmark; where, as appears from Leems, the canoes are of a very different construction.

The people of Iceland being of Norwegian extract, have few peculiar manners, but retain more of the ancient dress and customs of their ancestors. They are constrained to prepare flour from various plants described by Von Troil; and their chief animal nutriment is dried fish; the common beverage is syra, or sour whey, kept in casks and left to ferment, beer being scarce.

Language. If we except the Laponic, the languages spoken in the Danish dominions are all sister dialects of the Gothic. The Icelandic is the most ancient and venerable; and being esteemed the most pure dialect of the Gothic, has engaged the attention of many profound scholars, who have considered it as the parent of the Norwegian, Danish, and Swedish, and in a great degree of the English, though it would seem that this last is more connected with the Frisic and other dialects of the north of Germany. In the ancient Icelandic, the Lord's prayer is as follows:

Fader uor som est i Himlum. Halgad warde thitt nama. Tilkomme thitt Rikie. Skie thin Vilie so som i Himmalam so och po Iordannè. Wort dach-

* Leems, 570, &c.

Ircha Brodh gif os i dagh. Ogh forlat os uora Skuldar so som ogh vi forlate them os Skildighe are. Ogh inled os ikkie i Frestalsan. Utan frels os ifra Ondo. Amen.

In the Finnish it is as follows:

Isa meidan joca olet taiwassa. Pyhitetty olcon sinum Nimes. Lahes tulcon sinum Waldacundas. Olcon sinum tahtos niin maasca cuin taiwasa. Anna meile tanapaiwana meidan joca paiwainen leipam. Sa anna meille meidan syndim andexi nuncuin mekin andex annam meidan welwottistem. Ja alla jahdata meita kiusauxen. Mutta paasta meita pahasta. Amen.

And thus in the Laplandic:

Atki mijam juco lee almensisne. Ailis ziaddai tu Nam. Zweigubatta tu Ryki. Ziaddus tu Willio naukuchte almesne nau ei edna mannal. Wadde mijai udni mijam fært pæswen laibebm. Jah andagasloite mi jemijan suddoid naukuchte mije andagasloitebt kudi mije welgogas lien. Jah sissalaidi mijabni. Æle tocko kækkzællebma pahast. Amen.

It will hence appear that the Laplanders have borrowed some terms from the Gothic, as well as from the Finnish.

LITERATURE. The literature of Denmark cannot aspire of much antiquity, having followed, as usual, the introduction of Christianity, which was not established till the eleventh century. In the next century lived Saxo Grammaticus, whose history of Denmark abounds with fable, but whose style and manner are surprisingly classical for that age. His contemporary or predecessor, Sveno, is more veracious and concise, and is esteemed the father of Danish history. In general the ancient literature of Denmark is much more opulent than that of Sweden, as the collection of Danish historians may evince. Norway cannot boast of a native writer till a recent period; Theodric, the monk of Drontheim, who wrote a short history of the ancient kings, being supposed to have been a German. But it is a truly singular circumstance in the history of European literature, that letters highly flourished in the remote republic of Iceland, from the eleventh to the fourteenth century; and independent of the fabulous Sagas, which might be counted by hundreds, the solid and valuable works then produced in that island might fill a considerable catalogue. From Iceland we derived the Edda, and our knowledge of the ancient Gothic mythology. From Iceland the Swedes, Norwegians, Danes, and Orcadians draw their chief intelligence concerning their ancient history, Snorro in particular, being styled the Herodotus of the north: and the Landnama, or book of the Origins of Iceland, is a unique work, displaying the names and property of all the original settlers, and the circumstances attending the distribution of a barbaric colony.

After the restoration of letters, Denmark continued to maintain her wonted ascendency over Sweden; and the name of Tycho Brahe is yet celebrated, but his little isle of Hwen, noted for his astronomical observations, now belongs to Sweden. This last kingdom has for a century been more distinguished in literature than Denmark, which has been chiefly occupied in history and antiquities, while Sweden, without neglecting these provinces, has also cultivated, with great success, the most interesting branches of natural history. The names of Arnas Magnæus, Langebek, Schoening, and Suhm, are eminent among the cultivators of national history; and Holberg was a writer of

wit as well as of erudition. The botany of Denmark has been illustrated by Oeder: and Niebuhr is distinguished as an intelligent traveller: but in the other paths of science and literature there seems to be a deplorable deficiency; nor would it be easy to specify a Danish poet, philosopher, physician, or able and critical historian.

EDUCATION. The silence of travellers and geographers concerning the modes of education pursued in different countries has been more than once regretted in this work; but the materials are not equally deficient concerning Denmark. While in Sweden there is only a school in each of the large towns, maintained at the expense of the crown; in Denmark each parish is provided with two or three schools, where children are taught to read and write their native tongue, and the principles of arithmetic: the schoolmasters are allowed about twelve pounds a year, with a house, and some other advantages.* There are besides many Latin schools, maintained at the royal expense; sixteen in Holstein; eleven in Sleswic; nineteen in Denmark proper, or Jutland, and the Isles: but only four in the wide extent of Norway; and two in Iceland. These have a rector or chief master, a conrector, and two or three assistants; but the smallest have only one master, the salaries being from sixty to two hundred pounds a year. There is also a special seminary for the Laplanders at Bergen; and at Soroe, Odensee, and Altona, there are superior academies of education.

UNIVERSITIES. The universities are at Copenhagen, and Kiel. There ought to be another at Bergen. The royal academy of sciences was founded in 1742, but has been more distinguished in national antiquities, than natural history. In 1746, was founded the society for the improvement of northern history, also styled the royal society of Icelandic literature. There is another respectable institution at Drontheim, styled the royal society of sciences. These foundations confer honour on the Danish government; and will doubtless contribute to diffuse science, and inspire emulation.

CITIES AND TOWNS. Copenhagen, the chief city of Denmark, stands in a delightful situation, on the eastern shore of the large and fertile island of Zeeland, about twenty-five British miles to the south of the noted Sound, where the vessels that visit the Baltic pay a small tribute to Denmark. It is the best built city in the north, for though Petersburg presents more superb edifices, yet Copenhagen is more uniform; the houses being mostly of brick, but a few of freestone from Germany†. The streets are rather narrow, but well paved. This city only became the metropolis in 1443, being formerly an obscure port, whence it retains the name of Kiobenhaven, or the harbour of the merchants, and it has little claim to antiquity‡. The royal palace, which was a magnificent pile, was consumed by fire a few years ago: and the city suffered dreadfully from the same cause in 1728. It is regularly fortified, the circumference being between four and five miles, and the inhabitants about 90,000. The harbour is spacious and

* Coxe, iv. 57. v. 187. † Ib. v. 126.

‡ The most ancient capital was Leyre, or Lethra, near Roskild, which last became the metropolis about A. D. 950. Mallet Abr. p. 13. For Roskild see Busching, 182. Coxe, v. 262.

convenient, having on the south the isle of Amak, peopled by the descendants of a colony from East Frisland, to whom the island was granted by Christiern II, to supply his queen with vegetables, cheese, and butter, a destination still retained. The magistrates are appointed by the king; but the burgesses have deputies to protect their rights.

BERGEN. Next in dignity, though not in population, is Bergen, the capital of Norway, founded in the year 1070, though some ascribe the foundation to the preceding year. It is seated in the centre of a valley, forming a semicircle round a small gulf of the sea. On the land side it is defended by mountains; and on the other by several fortifications. All the churches and many of the houses are of stone. The castle and cathedral are remarkable edifices. The chief trade is in fish, hides, timber, &c. and Bergen was formerly connected with the Hanseatic towns. It retained the right of striking money till 1575. This city, being chiefly constructed of wood, has been exposed to repeated conflagrations, among which the most dreadful were those of 1248, 1472, 1640, 1702, 1756, and 1771; during which last it is said that the flames were visible in the isles of Shetland, or at least the red reflection in the sky. The population is computed at 19,000*

ALTONA. The third city of Denmark, and indeed the second in population, is Altona on the Elbe, within a gun-shot of Hamburgh, originally a village of the parish of Ottensen; but in 1640 it became subject to Denmark, and was constituted a city in 1664. In 1713 it was almost entirely reduced to ashes by the Swedes; but its commerce was afterwards so much fostered by the Danish sovereigns, as a diminutive rival of Hamburgh, that it is computed to contain 25,000 inhabitants†.

CHRISTIANA. Christiana, in the south of Norway, must also be named among the chief towns, though it only contains 10,000 souls. It stands in the midst of a fertile country; and is by some esteemed the capital of Norway, because it contains the chief court of justice, and is unquestionably the most beautiful town in that kingdom. It was founded by Christiern IV, in 1624, after Opslo was consumed by accidental fire. Christiana being situated in the midst of iron and copper mines, and not far from the celebrated silver mines of Kongsberg, the export of metals is considerable; but tar and deals form the chief articles. The deals are mostly sent to England; the redwood being produced from what is called the Scotch fir, and the white from the spruce fir‡.

DRONTHEIM. Drontheim, about 270 British miles to the north of Bergen, was anciently called Nidaros. The inhabitants are only computed at 8000; but as this is the most northern city in Europe, except Tornea, the population cannot of course be great. Drontheim is situated on the river Nid, whence it derived its name, and was founded in the year 997, being the residence of the ancient kings of Norway, and afterwards an archbishoprick, suppressed at the reformation. Of

* Busching, i. 369. † Ib. ii. 68. ‡ Busching, Coxe.

the cathedral, which was built of marble*, the choir alone remains. There is some commerce in wood, fish, tallow, and copper from the mines of Medal and Roras. The other towns of Denmark, as Gluckstadt, Elsinore, Flensburg, Kiel, Arhus, &c. have only from 300 to 6000 inhabitants.

EDIFICES. The chief public edifices are in the cities. The castle and palaces of Cronberg, and the two other royal villas in Zeeland, do not merit a particular description, the buildings and gardens being generally in an antiquated taste. The roads in Denmark and Norway were till lately much neglected, and formed a striking contrast with those of Sweden.

INLAND NAVIGATION. The chief inland navigation of Denmark is the canal of Kiel, so called from a considerable town in the north of Holstein. This canal is intended to unite the Baltic with the river Eydar, which flows into the German sea. The extent of this important canal is about twenty British miles and a half; the breadth 100 feet at top and fifty-four at bottom; the least depth is about ten feet, so as to admit vessels of about 120 tons†. It was begun in July 1777, and was finished in 1785. Jutland being generally a flat country, there is little doubt but great improvements might be effected by draining, and canals, on the Dutch plan, were not an absolute government commonly adverse to industry.

MANUFACTURES AND COMMERCE. The manufactures of the Danish dominions are few and unimportant. A most intelligent and instructive traveller, Mr. Marshall, has given an interesting description of the improvements made by a Danish nobleman, Count Roncellen, who had introduced manufactures of wool, leather, and iron, and founded a village of three hundred houses in the centre of North Jutland‡. He was cutting a canal of two miles; and had erected a wharf and docks, where he built his own ships, and exported his own manufactures. His improvements in agriculture were equally laudable; and such examples deserve perpetual commemoration more than the vain heroism of war. At Copenhagen are what are called the royal manufactures, in which Mr. Marshall says that 400 looms were employed, from the finest woolen cloth used at court, to that worn by the soldiery. Other manufactures have also been recently encouraged by the crown, which has paid more attention to commerce and agriculture than to the arts and sciences; though the former deplorable state of the roads, in which all travellers agreed, evinced that the Danes had not just ideas of improvement. The chief exports of Denmark consist of native products. Jutland with the Isles, Sleswic, and Holstein, generally export corn to a considerable amount; and the horses and cattle of the latter province furnish a supply to Holland. The cream-coloured horses of Oldenburg, a small maritime district in Westphalia formerly belonging to the Danish kings, who thence derive their origin, are of well known majesty and beauty. The chief products of Norway are wood, hides, chiefly those of the goat; with silver, copper, and iron; while Iceland exports dried fish, falcons and hawks, and eider-down.

* By recent accounts, lapis ollaris.

† Coxe, v. 301. ‡ Travels, ii. 150 to 204.

The commerce of this kingdom has been greatly improved since the acquisition of Altona, and the opening of the Kiel navigation. The colonies in the East and West Indies also supply some resources*.

* Mr. Marshall, ii. 289, pronounces Denmark to be in a flourishing situation; and justly warns his reader not to trust lord Molesworth, whose book is a mere declamation in favour of the whig aristocracy, which he confounds with liberty.

CHAPTER IV.

NATURAL GEOGRAPHY.

CLIMATE AND SEASONS.—FACE OF THE COUNTRY.—SOIL AND AGRICULTURE.—RIVERS.—LAKES.—MOUNTAINS.—FORESTS.—BOTANY.—ZOOLOGY.—MINERALOGY.—MINERAL WATERS.—NATURAL CURIOSITIES.

CLIMATE AND SEASONS. THE kingdom of Denmark proper, consisting of those ancient seats of the Danish monarchy, the isles of Zeeland, Funen, Laland, and Falster, with others of inferior size; and the extensive Chersonese or peninsula, which contains Jutland, Sleswic, and Holstein, may be considered as possessing a humid, and rather temperate climate. Yet the winter is occasionally of extreme severity, and the sea is impeded with ice. Norway, chiefly extending along the west side of the Scandinavian Alps, exposed to the vapours from the Atlantic, is not so cold a region as might be conceived. Finmark indeed feels the utmost rigour of winter; while in Iceland, on the contrary, that season is unexpectedly moderate, so as generally to permit the natives to cut turf even in January.

FACE OF THE COUNTRY. The aspect of such wide and detached regions may be conceived to be greatly diversified. The isle of Zeeland, which is about 700 miles in circumference, is a fertile and pleasant country, with fields separated by mud walls, cottages either of brick or white washed, woods of beech and oak, vales and gentle hills. The same description will apply to Funen, which is about 340 miles in circumference, and which Mr. Marshall says is as well cultivated as most of the counties in England. Holstein and Sleswic, are also level countries: and though Jutland present many upland moors, and forests of great extent, especially towards Aalborg or in the centre of the northern part, yet there are fertile pastures; and the country being marshy and not mountainous, might be greatly improved, especially if the proprietors were to reside upon their estates, instead of committing them to the care of stewards. Norway is, on the contrary, perhaps the most mountainous country in Europe; but in the south there are tracts of great fertility. Mr. Coxe describes this part as being sometimes fertile and agreeable; and though often rocky, the soil is rich. "The face of the country is prettily sprinkled with numerous lakes and rivulets, and thickly dotted with cottages, rudely though not unpleasantly situated on rocky emi-

nences, in the midst of the luxuriant forest*." The Norwegian Alps are frequently covered with dark forests of pines and fir, and the perpetual snow of the peaks is not accompanied with the glaciers and other terrors of the Alps.

Soil and Agriculture. In Holstein, and the south of Jutland, the soil is fertile; and Mr. Marshall compares the agriculture between Rypen and Warde with that of England, the fields divided by hedges and ditches in excellent order, and sown with corn and turnips, the tillage being performed with only four oxen. Further to the north cultivation was less perfect, with the exception of count Roncellen's estate; and the Germans who were invited to Sleswic and Holstein had better have transferred their industry to the north of Jutland, where, for a space of fifty miles Mr. Marshall only observed two small country seats; and a few Germans, who had been placed there, confined their labours to the dry ground instead of reclaiming the marshes, which would be far more productive. The agriculture of Zeeland and Funen is applauded by him; and if he had visited Norway it is probable that he would not have complained of the want of industry. In the latter country, though vegetation be in some places so quick that the corn is sown and reaped in six or seven weeks, yet the portion of arable ground is scanty, and far from sufficient to supply the consumption. In the autumnal rains, to which Norway is exposed, the peasants dry their harvest in a method which might be found useful in the Scottish Highlands, by erecting poles crossed by others, on which the sheaves are filed†. That mountainous country is however abundant in pasture and cattle; which, as in Swisserland, are driven to the heights in summer; and a patriotic society has so much encouraged agriculture, that within these fifty years estates have risen near one third in value‡. In the extensive island of Iceland, there is not much room for agriculture; which has, however, greatly declined since the period of the republic, when treatises were written on this interesting subject.

Rivers. In the kingdom of Denmark proper, the rivulets are numerous; but scarcely a river of any note except the Eydar, the ancient boundary between Denmark and Germany.

Lymfiord. Towards the north of Jutland an extensive creek of the sea, called Lymfiord, penetrates from the Categat to within two or three miles of the German sea, navigable, full of fish, and containing many islands||. This remarkable inlet, which is as it were a Mediterranean sea in miniature, might well be expected to enrich the neighbouring country, but seems to be neglected, as travellers and geographers are silent. There are several other creeks which are by the Danes styled Fiords, or Firths, but scarcely another river worth mentioning; for the Guden, which becomes navigable at Randers, is of a very confined course.

In Norway, as in Sweden, the largest rivers are called Elven or Elben. Those that rise in the Alpine chain, and run towards the west, have in consequence but a short course; and the chief ports, as

* v. 31. † See the plate in Pontoppidan's Norway.
‡ Coxe, v. 18. || Busching, i. 228.

in the west of Scotland, are supplied by creeks or inlets of the sea; the great depth of the water and height of the shore rendering this coast not a little unsafe to navigators.

Glomen. The chief river of Norway, is the Glom or Glomen, which is not navigable, but full of cataracts and shoals: yet about 50,000 trees are annually floated upon it to Frederickstadt. Before it receives the Worm from the lake Mioss, it is as broad as the Thames at Putney*; and its rugged course must render it a tremendous torrent. The Glomen, also called the Stor Elv, or great river, springs from the lake of Oresund on the north of the Fœmund, and runs nearly south about 300 British miles†.

Dramme. Next may be named the Dramme, which flows into the west side of the bay of Christiana, having received the Beina, and other considerable streams. Less remarkable rivers in the south of Norway are the Louven, the Torrisdals which runs by Christian Sand, and others flowing from numerous lakes. In Finmark the most considerable river is the Tana, which is followed by the Alten; both rising in the mountains to the north of Swedish Lapland, and flowing into the Arctic ocean.

Lakes. The lakes in the Danish dominions are numerous, the most extensive being in the south of Norway.

Mioss. The lake of Mioss is about sixty British miles in length, but the breadth is in general little considerable, except towards the centre, where it is from twelve to eighteen miles: it contains an island about ten miles in circumference, fertile in corn, pasture, and wood‡.

Rands. Next is the lake of Rands or Rands-Sion, which is near fifty miles in length, but not more than two in breadth.

Tyri. The lake of Tyri is a beautiful piece of water, about fifteen miles in length and breadth, diversified with many bays and creeks: the environs are delightful, consisting of corn fields, fertile meadows, and hanging forests, backed by lofty mountains towering above each other‖. Other lakes in the south of Norway are those of Ojeren, Or, Kroren, Tonhof, Tind, Huide, Nisser, Kiel, and Syredal. Further to the north is the large lake of Fæmund, about thirty-five British miles in length, by eight at its greatest breadth: this lake is celebrated by Bergman as being surrounded by mountains of great height. Yet further, in a northern direction, are found the lake of Sælbo, through which the Nid passes to Drontheim; and the lakes of Beitstadt and Snaasen. In Norland is that of Rys: and eastern Finmark presents that of Pasvig.

* Coxe, v. 62.

† In the map by Homann, corrected by Hubner, and prefixed to Pontoppidan's Natural History of Norway, the source is very different; and that author joins in the error p. 91. When it is considered that the book and the map were published in 1751, when Linnæus in the adjacent kingdom was diffusing the light of natural science, the errors of both are truly surprising. Perhaps the first tolerable maps of Norway, known in England, were that given by Mr. Coxe, and that contained in Arrowsmith's map of Europe. But even recent maps have not always been improved by these examples.

‡ Coxe, v. 59. ‖ Ib. 53.

MOUNTAINS. In the kingdom of Denmark proper, there are no heights, which can aspire to the name of mountains; but Norway is almost wholly an Alpine country.

NORWEGIAN CHAIN. The grand chain, which divides that kingdom from Sweden, is known by distinct appellations as it passes through different provinces. The mountains of Joglefeld may be regarded as its southern extremity, which does not here extend to that point of Norway called Cape Lindes, the Naze of seamen, but branches off towards the east. Proceeding northwards Joglefeld is succeeded by Buglefeld, and Heklefeld. Hardangerfeld forms a more extensive denomination, and detaches a branch towards the south-west. Under the parallel of 61° the chain assumes the name of Filifeld, followed by Sognefeld, and Langfeld, which terminates a little beyond the 62° of north latitude. The chain now assumes a winding direction from west to east, and this part, which is esteemed one of the highest, is styled Dofrafeld. Again turning to the north-east, we arrive at the parts towards the parallel of Drontheim, which are generally reckoned the most elevated, for towards Lapland the mountains decline in height. The successive names of this central portion are Rudfeld, Skarsfeld, and Sulafeld*. Jomafeld and Borrafeld, and some other local appellations, are continued by the general name of the mountains of Kolen, which pass along the east and south of Danish Lapland.

In a more general point of view, the southern part of the Scandinavian chain, running nearly north and south, and terminating at the province of Romsdal, is called LANGFIALL, or the Long Mountains. Hence the part called DOFRAFIALL extends towards the east, ending above the lake of Aursund or Oresund; where it again proceeds almost due north. Here also a considerable branch proceeds by Swucku, &c. towards Sweden†. The third part of the range, from the north of Oresund and the vicinity of the copper mines of Roras, is called the chain of KOLEN, extending between Norway and Swedish Lapland, and afterwards bending, in the form of a horse shoe, on the south of Finmark‡.

HEIGHT. The height of these mountains was, as usual, extremely exaggerated, and compared with the Swiss Alps, till more exactness was introduced into Orology. Mr. Pennant|| affords the most recent information on the subject. "Mr. Ascanius, professor of mineralogy at Drontheim, assures me that, from some late surveys, the highest in that diocese are not more than six hundred fathoms above the surface of the sea; that the mountains fall to the western side from

* The fabulous Pontoppidan calls this central chain (p. 41.) Sevebierg, or the Seven Mountains; and in his map the eastern parts towards Sweden are called Daarfeld. The name of Sevebierg, or the Seven Mountains, is palpably local, and has no reference to the general chain; though some writers affect to regard it as the same with Pliny's Sevo, which was in Germany. This term is, on the contrary, not only local, but recent, and perhaps only applies to the hills called the Seven Sisters, p. 46. It is unknown to former writers; and he confesses p. 41. that the only general name is LANGFELD, or the Long Mountains. See Schoning's map of Norway in the middle ages.

† It is to this last only that Pontoppidan gives the name of Sevebierg.

‡ Busching, i. 378. || Arctic Zoology, i. cviii.

the distance of eight or ten Norwegian miles*; but to the eastern from that of forty. The highest is Dovre-fiæl in Drontheim, and Tille in Bergen. They rise slowly, and do not strike the eye like Romsdalhorn, and Hornalen, which soar majestically from the sea. Professor Ritzius of Lund, acquaints me that Kinnekulle, in Westro-Gothia, is only 815 English feet above the lake Wenern, or 931 above the sea. He adds that the following have been only measured to their bases, or to the next adjacent waters: Areskutan, a solitary mountain of Jæmtland, about four or five Swedish miles from the highest Alps, which separate Norway and Sweden, is said to be 6162 English feet above the nearest rivers; Swuckustoet within the borders of Norway, 4658 above lake Famund, and that lake is thought to be 2 or 3,000 above the sea; and finally Sylfiællen, on the borders of Jæmtland, is 3132 feet perpendicular from the height to the base. By some late experiments the highest mountains of Sweden, between latitude 63 and 64°, have been found to be 6652 feet above the surface of the Baltic†: but no trees will grow on them at little more than half that height‡."

CONSTRUCTION. The construction of the Norwegian mountains has been little explored. nor is it understood whether the chief heights be calcareous like those of the Pyrenees, or granitic as is rather to be conceived. Some considerable mountains consist of sandstone; but we are equally ignorant whether this be the siliceous, the argillaceous, or the calcareous sand-stone. Norway abounds in beautiful marbles of various kinds, whence it appears that a considerable part is calcareous; and Pontoppidan has engraved a precipice full of large shells. The lapis ollaris, which Pontoppidan calls keegsteen, is found in great quantities, and with it were built the cathedral of Drontheim, and other edifices‖. This is generally found in the vicinity

* Of 18,000 feet each.

† "Mr. Tornsten in Act. Reg. Ac. Holm."

‡ Here would seem to be some mistake on the other side; and it is often to be regretted that Mr. Pennant's accuracy is not equal to his industry. Bergman computes the height of Swucku at more than 9000 feet above the sea; and says that it yields in height to the Norwegian Alps, which are here estimated by Ascanius, or mistaken by Pennant, at only 3600 feet above the sea! It is probable that for 600 we should read 1600 fathoms, which would yield 9,600 feet. Upon the whole it would appear that the Scandinavian chain is inferior in height to the Pyrenees, or even to the Carpathian.

Busching, i. 331, says that the mountains Tind and Goule, in the south of Norway, are the highest; but in this he errs in copying Pontoppidan, who says they are the highest in that quarter. The highest sharp summits are in Norway, as in Swisserland, called Horns, as Hornalen in Nordfiord, Sneehorn and Skopshorn, in Sundmoer, Romsdalhorn, and others. Many lofty mountains branch out on the west towards the sea.

Of the high mountain Wigeln, and the lake of Oresund, there is a view in Hermelin's Atlas. There are also some views of some Swedish and Laponic mountains, as Ruten near the lake Malmagen; of the high ridge between Herdal and Norway, which is patched with perpetual snow; and some in Lulea Lapmark. If there be any glaciers in Norway or Lapland, they have escaped Scandinavian research, and the aspect of the mountains rather resembles those of Scotland than of Swisserland.

‖ Pontoppidan, i. 166. ii. 276.

of granite; which last seems to be the pebble stone of that ignorant author. Asbestos and amianthus, also indicate granite; and rock crystals are found of great size and beauty, with talc, garnets, and amethysts. Chalk and flints are unknown. Further illustrations will arise in speaking of the mineralogy*.

Forests. There are some woods in the Danish isles, and forests in Jutland. The Norwegian mountains are generally clothed with pines and firs; and almost the whole country may be regarded as a forest, which supplies Europe with masts, and other large timber. The mountains of Scotland were once equally covered, though now denuded, nature sowing trees exceedingly thick, while man plants them so thin, that the plantation perishes for want of mutual protection. Norway may, in this respect, recal a just image of Britain as it appeared to the Romans.

Botany. The botany of Denmark proper does not materially differ from that of the other northern provinces of the German empire, which has already been slightly sketched in the account of Prussia, and will be hereafter noticed more minutely when describing the other states of the Germanic body. The botany of Norway will be incorporated with that of the rest of Scandinavia, under the article Sweden. All that is necessary therefore, in this place, is to mention those plants, natives of Denmark, which are either not at all, or but sparingly found on the other side of the Baltic.

Denmark, together with its German dependencies, is for the most part a flat country, and a large proportion of its surface is taken up with marshes and lakes: here and there occur ridges of low rocks, but no mountains even of the third magnitude are to be met with: the remainder of the territory is devoted to cultivation and pasturage, of which the most celebrated grazing tracts are included in the duchy of Holstein.

The sea shore affords the beautiful pulmonaria maritima, *sea lungwort;* and cochlearia Danica, Danish *scurvy-grass.* The dry open hills produce anemone pulsatilla, *pasque flower;* dianthus superbus. *fringed pink;* delphinium consolida, *larkspur;* gentiana filiformis; and astragalus Danicus. The woods and thickets yield cornus sanguinea, *red dogwood;* pulmonaria officinalis and angustifolia, *common* and *narrow-leaved lungwort;* impatiens noli-me-tangere; and the rare serapias rubra, *red helleborine.* The marsh ditches abound with stratiotes aloides, *water soldier;* and the meadows and hedge sides furnish ornithogalum luteum and nutans, *yellow* and *nodding star of Bethlehem;* ranunculus lanuginosus, *wooly crowfoot;* and œnothera biennis, *evening primrose.*

Zoology. The Danish dominions being of such great extent, and variety of climate and aspect, there is a great diversity in the animal productions. The horses of Norway and Iceland are as

* Bergman, p. 63, observes that many of the mountains of Norway are of pudding-stone, sometimes of quartz pebbles, united by grey micaceous cement (the same substance occurs in the Orkneys). Some are of hornblende slate in which garnets appear. Ibid. 74.

remarkable for diminutive size, as those of Holstein and Oldenburg* are for the contrary quality.

Rein Deer. Among the more peculiar animals may be first named the rein deer, common in Finmark and throughout Lapland. This animal resembles a stag, but is stronger; and the deep division of his hoofs is adapted to tread on the snow, being suited by Providence to a cold climate, as the camel is to the hot desert. The antlers of the rein deer are longer and more branched than those of the stag, and they also decorate the brows of the female. These animals are still numerous in a wild state, though the Laplanders have reclaimed great numbers, which supply the place of horses and cattle. The elk is a more southern animal, and sometimes appears in Norway, which is infested by the bear, the wolf, and the lynx. The glutton is also rather a peculiar animal; and the beaver constructs his mansion in Norway, with the same skill as in North America.

Lemming. The Lemming, or Norwegian mouse, proceeds from the ridge of Kolen, and sometimes spreads desolation, like the locust. These animals appear in vast numbers, proceeding from the mountains towards the sea, and devouring every product of the soil: it would seem, that after consuming every thing eatable in their course, they at last devour each other. This singular creature is of a reddish colour, and about five inches in length. Norway also boasts of some peculiar birds, as the picus tridactylus, and the tetrao lagopus. The snake called aspis is also found there. In Danish Lapland, the squirrel, which is red in the summer, in the winter becomes grey†. The author last quoted, maintains the fable of the kraken; and his description, derived from the natives of Norland and Finmark, corresponds with that of Pontoppidan. The salmon supplies a considerable part of the Laplander's food; and vast numbers are transported on rein deer from the shores of the Tana.

Finmark. Hares are also common in that remote region: and the bear, lynx, and fox, are less welcome visitants; nor are the glutton and the beaver there unknown. About Roras in Norway, the latter animal is sometimes found white.

Mineralogy. The mineralogy of the Danish dominions, is chiefly restricted to Norway, for in Jutland, and the Isles, no important discoveries have arisen, though it be probable that iron, and perhaps coal, may be found. Jutland supplies tripoly, and fullers' earth, with some alum, and vitriol. The isle of Moen has hills of chalk; and porcelain clay is found in Bornholm. These regions seem chiefly calcareous, yet free-stone is rare. Norway, on the contrary, abounds in various metals. About the year 1645, some gold ore was found near Arindal, of which ducats were struck. But in gold, Norway yields greatly to the Swedish mines of Adelfors, and only claims the superiority in silver, the mines of Kongsberg, about forty British miles to the south-west of Christiana, having been long reputed the richest

* Oldenburg has been recently assigned to the younger branch of the house of Holstein Gottorp. Bruns, Geog. &c. Riesbeck, iii. 121, says that the detached principality contains 75,000 souls; the revenue 40,000*l.*

† Leems, p. 219.

in Europe; and one mass of native silver in the royal cabinet weighs 409 marks, being worth 3000 rix-dollars, or 600*l**.

SILVER. These mines are minutely described by Bergman, who informs us, that the rock consists of vertical banks of micaceous schistus, with garnets, lime-stone, and quartz. The richest veins are in those of a greyish quartz, mingled with small black mica, and reddish petrosilex; but especially in a fine-grained white quartz, and a little calcareous earth, or where the quartz and mica are in alternate strata; the thickness of these banks or layers varying from an inch to three fathoms; and some of them are impregnated with iron. They are passed transversely by the veins of metal, from half an inch to more than two feet in thickness, sometimes accompanied with large grained lime-stone, but more often with spar; and sometimes with quartz, fluors, white, blue, or violet sclenite, and fossil cork, and sometimes with pyrites, yellow copper ore, and blende†. The ferruginous layers are the most productive. These mines were discovered in 1623 by two peasants, who were diverting themselves with throwing stones; and in consequence the town of Kongsberg was founded. They are worked by thirty-six shafts, and used to yield about 70,000*l*. annually, when 4000 men were employed; but recently 2400 have removed to the cobalt mines at Fossum, twenty miles to the north, and it is supposed that the produce barely defrays the expense. Yet they supply the mint with currency, the largest coin being of eight Danish skillings, or four pence sterling; and it is esteemed a peculiarity of this mine, that it may be little productive during a year or two, when suddenly a rich vein is discovered, which amply repays the loss of labour‡. Kongsberg is a flourishing town of 6000 inhabitants, situated amidst hills and rocks, which branch off from the great Alpine chain, being about eighty British miles south-east of the Langfeld: the river Louven runs through the town, in a series of small picturesque cataracts.

Norway also possesses other silver mines at Iarlsberg in the same region, about thirty miles to the north-east, discovered in 1726, but of small account.

COPPER. The important copper mines of Roras, about sixty-eight British miles south-east of Drontheim, were discovered in 1644. They are in the southern slope of the chain of Dofra, in a rock of what the Germans call hornschiffer, or hornblende slate, yet Bergman mentions quartz and mica as ingredients; and he adds that the gangart is *hornberg* or hornblende, "of so fine a grain that neither the quartz nor the mica can be distinguished in its texture||." The veins are from six inches to six ells in thickness; and the ore of a pale yellow. The mine of Storward is in a high mountain; the rock being grey gneiss,

* Coxe, v. 45. † Journal des Mines, No. xvi. p.50.

‡ Pontop. i. 183, &c. Coxe, ut supra.

|| Such indications are mentioned, as they may lead to discoveries in other countries; but Bergman's account is far from the accuracy of modern mineralogy, and his descriptions seem neither to refer to hornblende nor petrosilex. From Raspe's Ferber, 327, is appears that petrosilex was conceived to be quartz and mica intimately blended, so as not to be distinguished by the eye. It is equally difficult to explain Busching's meaning, i. 340, when he says the chief copper mines are at Werdenfiels. Roras is in Guledal.

which is followed by a blackish steatite. In general the mines of Roras are very productive, and a source of considerable revenue. Other copper mines are at Quickne and Selboe, about fifty miles to the east of Drontheim, and at other places.

Cobalt. The mines of cobalt at Fossum, a recent discovery, must not be passed in silence. This metal yields smalt, or powder blue, used in painting, pottery, and porcelain, and in colouring starch; and the mine is supposed to produce a clear annual revenue to the crown of about 15,000*l.* Near it is a rich vein of quartz, containing large masses of talc*.

Iron. But the iron mines of Norway are esteemed the most profitable. They are chiefly situated not far from Arindal, in the southern province of Christiansand; and near Skeen, between Arindal and Kongsberg†. Lead appears in the vicinity of Kongsberg; and there are alum works near Christiana. Norway produces abundance of marble, with some alabaster, and lapis ollaris. Rock crystals occur of a large size, often brown or yellow, like those of Bohemia and Piedmont, the Cairngorm stones of Scotland. In Iceland are found many volcanic productions, particularly black obsidian. The isles of Ferroe produce agate, jasper, and beautiful zeolites. Jade and magnets are also found in Norway; with curious garnets, especially the green, which are little known in other countries.

Mineral Waters. In mineral waters the Danish dominions are very deficient; and those discovered in 1768 at Oersten in the Sondmoer appear to be little frequented.

Natural Curiosities. While the southern parts of the Danish dominions present few natural curiosities, the northern provinces afford many singular features.

The Malstrom. The Mokoestrom, or Malstrom, is a remarkable whirlpool off the shore of Norland, which will involve boats, and even ships: nay the bellowing struggles of the whale have not always redeemed him from the danger: the bottom is full of craggy spires, and the noise truly tremendous. On the south of the Ferroe isles, there is another dreadful whirlpool. The volcanoes of Iceland may also be classed among the grandest features of nature.

Mount Hekla. Among these mount Hekla is the most remarkable, being situated in the southern part of the island, about twenty British miles from the sea, above which it rises to the height of about 5000 feet. The summit is covered with snow, except some spots where the heat predominates. The craters are numerous, but the eruptions rare; there having only been ten from the year 1104 to 1693, after which it remained quiet till 1766, when it emitted flames and lava. The mountains of Krabla near Myvatn, in the north-west, and of Kattlegia, were more known than Hekla by their eruptions in the eighteenth century. The boiling springs of Iceland present a singular phenomenon: that of Geyser to the north of Skall-

* Coxe, v. 49.

† According to Busching, i. 341, ochre is found near Wardhus, in Finmark, of a beautiful sky blue, probably like that of Elba, and the sign of a rich iron mine.

holdt is the most remarkable, rising from an aperture nineteen feet in diameter, and springing at intervals to the height of fifty, or even ninety feet*. Of smaller consequence are several picturesque scenes in Norway, as the hills called the Seven Sisters, in Helgoland in the parallel of Tornea. In the same district is the rock of Torghatten, with a perforation of great length and diameter, through which the sun may at times be seen. At Dolsteen, near Herroe, in Sundmoer, is a cavern of great length; and at Limur, not far from Ourskoeg, is another cavern above a stream, which seems, formerly to have flowed through this superior channel. About twenty miles to the north of Bergen, the rocks abound with singular petrifactions. The mountains are sometimes split and ingulphed by subterranean waters, of which Pontoppidan relates some instances, more to be credited, as a similar event recently happened in the south of France. The farm of Borre, in the province of Christiana, was in 1703, swallowed up with all its buildings, and there now remains only a chasm full of ruins and sand†.

* Van Troil, 260. † Busching, i. 360.

DANISH ISLES.

THE prime seat of the Danish monarchy having ever been in the isles of Zeeland, Funen, Laland, Falster, and the others of the group, they have been considered in the general description of the monarchy. In the east, the furthest isle belonging to Denmark, is that of Bornholm, a small, but fertile spot, conquered by the Swedes in 1645, and surrendered to them by the treaty of Roskild, 1658; but the inhabitants revolted the same year, and restored their isle to the Danish domination, under which it has since continued.

Off the western coast of Jutland, are the isles of Nordstrand, Fora, Sylt, Rom, Fanoe, and others, which, with Helgeland, were known to the Romans: and the writers of that nation appear often to have confounded them with some of the Orkneys, and even with the islands in the Baltic*.

The Norwegian coast presents one continued series of small and unimportant islands, most of them indeed uninhabited. Among a few worthy of mention, may be named Karm, Bommel, Sartar, Hitteren, and others at the entrance of the gulf of Drontheim; the Vikten or Viktor islands are followed by those of Loffoden, the most numerous and extensive, and noted for the whirlpool of Malstrom. Among the dreary isles on the Laplandic shore may be named Soroe and Mageroe, that of Wardhus, where there is a garrison in the Arctic ocean; and the isle or peninsula of Fiskeroe, part of which belongs to Russian Lapland.

The isles of Vikten or Viktor produce oats and barley; and it was from them that the powerful Rollo sailed to France. Those of Lof-

* These isles have suffered greatly by the fury of the ocean. Nordstrand, after repeated attacks in the years 1350, 1354, &c. was at length almost totally swallowed up in 1634. Such an inundation arose on the 11th of October, at ten o'clock in the evening, that there perished 6408 persons, with 50,000 cattle; 1332 houses, thirty windmills, and six churches were swept away by the waves. There remained but a high part of the isle now called Pelworm. Helgeland, which has been subject to the Danes since the year 1714, has also been diminished by repeated assaults of the ocean. Busching, i. 293, 294.

foden have excellent fisheries, and the pasturage suffices for numbers of sheep. The isle of Karm is chiefly remarkable for the high mountain of Augvald. The Norwegian isles are, in general, mountainous or craggy, like the corresponding coast, with precipitous rocks, and a sea from 100 to 300 fathoms deep washing their bases. Between them are numerous narrow creeks, overshaded by vast heights, like those of the shore, and guarded, as it were, by innumerable smaller isles, and desert rocks, haunted by screaming sea-fowl.

For many years the Norwegians held the isles of Orkney and Shetland, which last was styled by them the Land of Hialt, from an adventurer so called, whence the corrupt names of Zetland, Yetland, and Shetland.

FERROE ISLES. The Ferroe isles remain an appanage of the Danish crown, they are seventeen in number, and not unfertile, producing some barley, and abundant pasturage for sheep. Small junipers, stinted willows, and birches, alone bear a diminutive image of trees. They were discovered prior to Iceland, in the ninth century; and export feathers, eiderdown, caps, stockings, and even salted mutton and tallow. Beautiful calcedonies and zeolites are found in the Ferroe isles; but there seems no reason to believe that they ever were volcanic. The inhabitants do not exceed 5000.

ICELAND. The large and celebrated island of Iceland may be regarded as 260 British miles in length, from the most western cape, to the most eastern, and about 200 in breadth from north to south, but the inhabitants do not exceed 50,000. The government was an aristocratic republic for about 387 years, till in 1261 it submitted to Norway. The maps of this country are far from being perfect: and the like complaint might justly be extended to the Danish dominions in general; but as far as can be judged, the chief range of mountains runs, like the Carpathian, from the south-east to the north-west, with some branches diverging north-east. This island forming so extensive a portion of the Danish dominions, several circumstances concerning it have been given in the general narration. While it abounds in sulphur and subterranean fires, and volcanoes appear in every quarter, it would be too bold a theory to suppose that so wide an expanse was ejected from the sea, not to mention that the surturbrand, or carbonated wood, found at a great depth, evinces a most remote vegetation. The highest mountains clothed with perpetual snow, are styled Yokuls; and of these Snæfial, hanging over the sea in the south-west part of the island, is esteemed the highest, being computed at 6860 feet.† The mountains are said to be chiefly sand-stone, pudding stone, with petrosilex, steatite, and argillaceous schistus. The chief rivers of Iceland are in the east; the Skalfanda, the Oxarfird, and the Brua, all flowing from the south to the north. Some are white with lime, others smell of sulphur. The calcareous spar of Iceland is celebrated for its double refraction since the days of Newton: calcedony, zeolite, lava, pumice, and malachite, or copper stalactites, are among the mineral productions. In the middle of the fourteenth century, this isle was greatly

† Pennant, A. Z. lxiii.

depopulated by a pestilence, called the Black Death*. A volcanic island recently arose to the south of Iceland, but afterwards disappeared. From Iceland a colony passed to Greenland, a short course of about 200 miles; but the Danish colony in Greenland has been long explored in vain, the eastern coast on which it was settled being since blocked up by the ice. This barbaric colony was little aware, that its settlements belonged to another quarter of the globe, Greenland being now universally considered as a vast peninsula attached to the continent of America.

* Iceland is said to have suffered greatly by commercial monopoly, but the company was suppressed in 1759. Busching, i. 417. Every benefit ought certainly to be extended by the Danish government to the poor inhabitants of so remote and barren a country.

SWEDEN.

CHAPTER I.

HISTORICAL GEOGRAPHY.

NAMES.—EXTENT.—BOUNDARIES.—ORIGINAL POPULATION.—PROGRESSIVE GEOGRAPHY.—HISTORICAL EPOCHS AND ANTIQUITIES.

NAMES. SWEDEN, in the native language Suitheod, and more modernly Swerige, appears to be a very ancient appellation, and is said, by the northern antiquaries, to imply a country whose woods had been burnt, or destroyed. The name seems as ancient as the time of Tacitus*, who, after describing the Suiones who lived in islands of the ocean, passes to the Sitones, and afterwards to the nations at the further end of the Baltic. It is evident that Cluverius has in this, as in other instances relative to the north of Europe, been blindly followed by D'Anville, and other geographers, who suppose that the Sitones are the Danes or Norwegians, and the Suiones the Swedes. The learned Huet†, on the contrary, well perceived that the Suiones must be on the west; though he err in placing them in Norway, which was almost unknown to the ancients. The Sitones must have dwelled in the southern provinces of Sweden; and the name either have been derived from Sictuna, the old name of the chief town, as appears from Adam of Bremen, or from Suitheod the native term, softened as usual by the Roman enunciation.

EXTENT. The kingdom of Sweden is of very considerable extent; being from the most southern promontory of Scone, to the

* German. c. 44, 45. † Commerce des Anciens, ch. xlii. p. 234.

northern extremity of Swedish Lapland, not less than 1150 British miles in length; and from the Norwegian Alps to the limits of Russia about 600. The contents in square miles have been computed 208,912; and the inhabitants being some years ago supposed 2,977,345, there will be fourteen to the square mile, including Swedish Pomerania, computed at 1440 square miles, and 103,345 inhabitants.

ORIGINAL POPULATION. As there is no evidence that the Celts ever penetrated to Scandinavia, the first population appears to have consisted of Fins, who, perhaps seven or eight centuries before the Christian era, were supplanted by the Goths, mythologically represented as having been conducted by Odin, or the God of War. These Goths gradually proceeded from their native seats in the north of Persia, and along the Euxine; and while one division passed to the west, or into Germany, another, in a northern progress reached Scandinavia, where no foreign conquest having since extended, the population continues purely Gothic in the southern parts; while in the north, there are remains of the Fins; and above them the Laplanders, a native diminutive race resembling the Samoieds of the north of Asia, and the Esquimaux, and Greenlanders, Arctic races of America. If any isles exist near the south pole, it is probable that the inhabitants will be found of diminished size, and manners resembling those of the northern progeny. The Laplanders are, however, superior to the Samoieds, or Esquimaux, because they have intermarried with the Fins, a race of greater dignity; and their language being originally very rude and barren, as their wants and ideas were few, they have in a great measure adopted that of the Fins their neighbours.

PROGRESSIVE GEOGRAPHY. Only the southern parts of Scandinavia being known to the ancients, its progressive geography is rather obscure. The only people there situated known to Tacitus were the Sitones. Pliny appears to have confounded the knowledge of the ancient Greeks, concerning Britain and Ireland, with that of the Romans concerning the Baltic; but he expressly names Scandinavia, a part of which was inhabited by the Hilleviones, perhaps in the south of Norway, or in Holland, while his Eningia is probably the south-western shore of Gothland, which the Romans, deceived by the intervening gulf of Christiana, supposed to be another island. Ptolemy mentions five or six tribes, among which are the Gutæ of Gothland, as inhabiting the portion of Scandinavia known in his time; which, from the size he ascribes to it, could not have passed the lakes Wenner, and Weter. His four Scandinavian islands, are evidently those of Zecland, Funen, Laland, and Falster. After this period there is little progress in Scandinavian geography, till the time of Jornandes, in the sixth century, who describes Scanzia, or Scandinavia, at some length, and mentions various nations by whom it was inhabited*. The next notices are due to the voyages of Ohter, recited by our Great Alfred;

* The names are corrupt, but might, like the whole of this author, be greatly improved from the Ambrosian MS., whose various readings are published by Muratori in the first volume of his Italian historians. In a new edition, that MS. should be adopted as the text, and the few various readings that are worth preservation should be given on the margin.

and the more certain and general knowledge begins to dawn with Adam of Bremen, and the Icelandic historians.

Historical Epochs. The following seem to constitute the chief historical epochs of Sweden.

1. The early population by the Fins and Laplanders.

2. The conquest by the Goths.

3. What little knowledge the ancients possessed concerning the south of Scandinavia.

4. The fabulous and traditional history, which begins about the year of Christ 520, and includes the conquest of Sweden by Ivar Vidfatme king of Denmark about A. D. 760. Hence there is an obscure period till the reign of Biorn I, A. D. 829, commemorated, with his immediate successors, by Adam of Bremen.

5. The conquest of Denmark by Olaf II about the year 900.

6. The reign of Ingi the Pious, A. D. 1066, after which the history is sufficiently clear as the Danish is after Gormo A. D. 920. Lagerbring, one of the best native historians, divides the ancient kings into the Ynglingian race the most ancient in traditional report; and which terminated at the conquest by Ivar Vidfatme, who was succeeded by his grandson Harold Hildetan, and his great grandson Sigurd Ring: followed by another branch called the race of Sigurd.

7. The partial conversion of Sweden to Christianity, in the reign of Olaf III, A. D. 1000; but more than half a century elapsed before Paganism can be considered as finally abandoned, in the reign of Ingi the Pious: whose father Stenkil is regarded as the founder of a new dynasty, though he sprung from the house of Sigurd. But the crown was now considered as having become elective.

8. The accession of the Folkungian branch, about the middle of the thirteenth century.

9. The Swedes discontented with their king Albert of Mecklenburg, in 1388 elected, as their sovereign, Margaret, heiress of Denmark and Norway. Thus ended the Folkungian race: and by the celebrated treaty of Calmar, A. D. 1397, the three kingdoms of the north were supposed to be united forever. But after the death of Margaret, in 1412, the Swedes began to struggle for their liberty; and in 1449 Karl or Charles VIII, was elected king of Sweden: having assailed the property of the church, he was forced to leave the kingdom, 1457, but was afterwards restored.

10. The struggles between Denmark and Sweden, till the cruel and tyrannic reign of Christiern II, king of Denmark, Norway, and Sweden.

11. Tyrants are the fathers of freedom. Gustaf Wase, whom we style Gustavus Vasa, delivers his country from the Danish yoke, after a contest which forms one of the most interesting portions of modern history. The revolt may be considered as having commenced when Gustaf appeared at Mora, in Dalecarlia, A. D. 1520, and completed three years afterwards, when he entered Stockholm in triumph. Dissatisfied with the power of the clergy, which had repeatedly subjugated the kingdom to Denmark, this great prince, 1527, introduced the reformed religion; and died in his

seventieth year, September, 1560, after a glorious reign of thirty-seven years.

12. The reign of Gustaf Adolph, or Gustavus Adolphus, A. D. 1611—1631. Austria, Spain, and the other Catholic kingdoms, having conspired to extirpate the Protestant religion in Germany, this king was invited to assist the reformed; and carried his victorious arms to the Rhine and the Danube. His daughter Christiana, a pedant in petticoats, having formed a classical attachment to Italy, abandoned the Swedish throne, and embraced the Catholic religion, which her father had so strenuously opposed.

13. The reign of Charles XI, 1660—1697, when the arts and sciences began to flourish; and the power of the kingdom was carried to its utmost height. This reign of solid beneficence was followed by the calamitous sway of that madman Charles XII, whom Pope was so ill informed as to assimilate with Alexander the Great, whose conquests were conducted upon principles wholly the reverse, and were crowned by establishments directed by an enlarged mind, capable of views of eternal benefit and duration.

14. After the weak reign of Charles XII, Sweden sunk into political humiliation: and is now regarded as little better than a province of Russia, to which disgrace the Swedish aristocracy as naturally tends as that of Poland. In a poor state, under that form of government, it is natural that the leaders should sell their country to a neighbouring power, except severely guarded as at Venice; and the revolution under Gustaf III, 1772, must be considered as beneficial to Sweden. For the Russians, by the corruption of the aristocracy, had almost subjected the kingdom: when the sovereign, assisted by the counsels and money of France, then inimical to Russia, the ally of England, accomplished his victory over the nobles. The assassination of that prince, and the subsequent events are little momentous in a general point of view: and, though more free from Russian intrigue, Sweden bends in terror before that powerful name.

ANTIQUITIES. The ancient monuments of Sweden consist chiefly of judicial circles, and other erections of unhewn stone, followed by the monuments inscribed with Runic characters, some of which are as recent as the fifteenth century, and none of them can safely be dated more anciently than the eleventh. Not far from Upsal is the morasten, or stone on which the king used to be enthroned, as the old Scottish monarchs were at Scone. The ancient temples, called Skior, or Skur, were of wood, and have consequently perished. Of the old churches and castles, erected since the use of stone, Dahlberg has engraved many*; and some of the latter are remarkable for their resemblance to what are called Pictish castles in Scotland.

* Suecia antiqua et hodierna.

CHAPTER II.

POLITICAL GEOGRAPHY.

RELIGION.—ECCLESIASTIC GEOGRAPHY.—GOVERNMENT.—LAWS.—POPULATION.—COLONIES.—ARMY.—NAVY.—REVENUES.—POLITICAL IMPORTANCE AND RELATIONS.

RELIGION. THE religion of Sweden is the Lutheran, and this kingdom has retained an archbishoprick, a pre-eminence abolished in Denmark; with thirteen prelacies.

ECCLESIASTIC GEOGRAPHY. The parishes amount to 2,537. The priests are computed at 1,378; with 134 vicars, and 192 prepositi, or inspectors*. Some of the parishes are very extensive, as that of eastern Bothnia, which is about 150 miles in length, by forty-eight in breadth; and another parish in Lapland is still larger. A consistory of the clergy of the diocese elects the archbishop, and the bishops, by presenting three to the king for his nomination. Some of the parishes are under the royal patronage; others in the gift of individuals; but many are called consistorial, and the priest is appointed by the votes of his brethren.

GOVERNMENT. The revolution of 1772 pretended to restore the government to the form established by Charles XI; and which had lapsed into a factious mixture of aristocracy. But by the act of union, 1789, the constitution became an absolute monarchy; the monarch having arrogated not only the rights of peace and war, and the administration of justice, but the imposition of taxes, without the consent of the diet, which cannot deliberate on any subject till it be proposed by the sovereign. The diet consists of nobles, and landed gentlemen, clergy, burgesses, or deputies of towns, and those of the peasantry. Each of the four states has a speaker; the archbishop of Upsal being always the speaker of the clergy, while the king nominates the others. The diet of 1786 consisted of forty-nine counts, 136 barons, 188 knights, 396 gentlemen, fifty-one ecclesiastics, ninety-four burgesses, and 165 deputies of the order of peasants†. As the monarch is not opulent, it is evident that so large and respectable a body, might constitute a formidable barrier; but the evils of faction have been so great and impendent, and the Russian power and influence so destructive to the very existence of the state, that the deputies seem justly to regard the dictatorial power of the church as necessary to their own preservation.

POPULATION. When the great extent of the Swedish territory is considered, the population will appear comparatively small; a cir-

* Olivarius Le Nord Litteraire, No. 12. † Ibid.

cumstance, arising in part from the mountainous nature of the country, and in part from the severe climate of the northern districts; Swedish Lapland being supposed not to contain more than 7000 inhabitants. Yet at present the population of the kingdom is thought to exceed 3,000,000. The nobility are so numerous as to be computed at about 2,500 families; while the peasants, the most numerous class, amount to about 2,000,000. This great number of nobility was connected with the aristocratic form of the government, which bore a semblance to that of Poland, and Hungary, the latter kingdom still remaining too aristocratic for the regular distribution of good government through all the classes of the community. The example of Poland, will, it is hoped, convince these aristocracies, that the transition of their power to the monarch is indispensably necessary to their own preservation*.

COLONIES. Sweden only possesses one small colony, that in the island of St. Bartholomew in the West Indies, which was ceded to them by the French in 1785†.

ARMY. The Swedish army consists of national troops, and of foreign infantry, the latter being computed at about 12,000. The total amount of the army may be 48,000; and the soldiers are of distinguished valour and hardihood, and elated with the former fame of the Swedish arms. But on a late invasion of the Russian dominions they were found to be more obedient to the aristocracy, than to their sovereign.

NAVY. So fatal were the naval operations of 1792 that the Swedish fleet, which consisted of thirty ships of the line, cannot now display above half that number. In the Baltic, which is full of low coasts and shoals, gallies of a flat construction are found more serviceable than ships of war, and of course great attention is paid to their equipment by Sweden as well as Russia.

REVENUE. The revenue of Sweden is computed at about a million and a half sterling; which is equalled by the expenses of the government. The national debt cannot be much less than 10,000,000 sterling, as it was augmented during the late regency; but the young monarch is anxious for its reduction. This debt being chiefly incurred in Hamburgh, the country is overwhelmed with the paper money of

* Olivarius computes the population in the following manner, from the enumeration made in 1784.

Nobility. Individuals from the age of fifteen to sixty-three, men 3,869, women 2,865, children 1,904; individuals above and under those ages 8,200; domestics 27,263.

Burgesses. Individuals from the age of fifteen to sixty-three, men 28,492, women 23,563, children 11,068; individuals above and under those ages 60,500; domestics 31,868.

Clergy. Individuals from the age of fifteen to sixty-three, men 5,663; women 4,120, children 2,775; individuals above and under those ages 12,000; domestics 15,980.

Public Officers, including the military. Individuals from the age of fifteen to sixty-three, men 23,872, women 18,230, children 8,823; individuals above and below those ages 48,700; domestics 41,809.

Peasants. Individuals from the age of fifteen to sixty-three, men 320,772, women 296,664, children 257,213; individuals above and below those ages 813,500; domestics 195,388.

† Olivarius Le Nord Litteraire, No. 12.

that city; and the scarcity of gold and silver, and even of copper currency is incredible. The ducat is the only gold coin, worth about nine shillings sterling; while the silver crown may be valued at four shillings and six-pence. The schelling, or shilling, is worth little more than one penny sterling; and the copper consists of half and quarter shillings, the ancient heavy pieces being now rarely visible, and supplanted by bank-notes, some of which are for very diminutive sums.

POLITICAL IMPORTANCE AND RELATIONS. The political importance and relations of this kingdom are much diminished since the glorious reign of Gustaf Adolph, and the beneficent sway of Charles XI. Prior to the late revolution in France, Sweden had remained a faithful ally of that kingdom, which excited against her many enemies in Germany, as Scotland was formerly involved in the wars between France and England. Of late, this alliance seems to be sacrificed to a more useful connexion with Denmark, and Prussia, which can alone guard the north of Europe from the progress of the Russian preponderance. The disorder of the finances unites with many causes of discontent, both among the aristocracy and among the peasantry, to render the power of Sweden little apparent in the political balance of Europe.

CHAPTER III.

CIVIL GEOGRAPHY.

MANNERS AND CUSTOMS.—LANGUAGE.—LITERATURE.—EDUCATION.—UNIVERSITIES.—CITIES AND TOWNS.—EDIFICES.—ROADS.—INLAND NAVIGATION.—MANUFACTURES AND COMMERCE.

MANNERS AND CUSTOMS. THE manners and customs of the superior classes in Sweden are so much tinged with those of the French, their allies, that no striking peculiarity can be observed; and even the peasantry have so much vivacity and address, that they have been styled the French of the north. The complexion, which in the northern latitudes is generally fair, is here much diversified, being in some provinces extremely brown. The men are commonly robust and well formed; and the women slender and elegant. Their attachment to luxury is, in some measure, compensated by their love of hospitality. The peasants, in general, make their own furniture and clothes; trade and manufactures having made very little progress. The natives of the western provinces of Dalecarlia retain many ancient customs, and have been distinguished for their courage and probity, since the time that Gustaf Wase issued from the mines of that country to break the yoke of Denmark. The Finlanders, on the east of the Bothnic gulf, are now little distinguishable from the Swedes; and any remarkable peculiarities of manners and customs, must be sought in Swedish Lapland, which has long since been described by Scheffer, whose work was translated into English, and rendered more familiar by an extract in the Spectator*. Danish Lapland being more remote, less known, and more recently described, an account of this singular people is given under the article of Denmark.

LANGUAGE. The language of Sweden is a dialect of the Gothic, being a sister of the Danish, Norwegian, and Icelandic. In the two grand divisions of the Gothic, consisting of the German and Scandinavian dialects, the latter is distinguished by greater brevity and force of expression. In the south of Sweden, which contains the chief mass of population, some German and French words have been adopted; while the Dalecarlian on the north-west is esteemed a peculiar

* See also the descriptions by Maupertuis, Kalm, Coxe, Consett, &c.

dialect, perhaps, only because it contains more of the ancient terms and idiom. The Finnish gradually yields to the Swedish; but the rude Laplander retains his old speech, or rather, a dialect of the Finnish adopted by his ancestors. The Swedish language is sufficiently sonorous, if the pronunciation were more emphatic. The affectation of terminating names with *us*, as if they were Latin, begins gradually to expire, after a ridiculous reign of two centuries.

LITERATURE. In the antiquity of literature, Sweden cannot pretend to vie with Denmark, Norway, or Iceland: the most early native chronicle, or perhaps literary composition, being not more ancient than the fourteenth century. In return, while the Danes seem occupied with internal policy and public regulation, the Swedes have, in modern times, borne the palm of genius in many departments of literature and philosophy. One of the most remarkable names of Sweden, prior to the reformation, was that of St. Brigit, who flourished in the middle of the fourteenth century, and whose pretended prophecies were collected with great care, and published in Latin. When the bishops were expelled from the kingdom by Gustaf Wase, John and Olaus Magnus, retired to Rome, where one published a fabulous description of Scandinavia; while the other gave to the world a yet more fabulous history of his native country. But Swedish literature can hardly be said to have dawned till the middle of the seventeenth century, when the queen Christina, finding the country immersed in ignorance, invited Grotius, Descartes, and other celebrated men, who, though they did not reside in the kingdom, yet sowed the seed of letters, which gradually began to prosper in the wise and beneficent reign of Charles XI. In the succeeding or last century, the name of Linnæus alone, might distinguish the national literature: and it is joined in natural history with those of Tilas, Wallerius, Quist, Cronstedt, Bergmann, and others. In history, Dalin and Lagerbring have distinguished themselves by a precision and force, which the Danes seem to sacrifice to antiquarian discussions. Sweden also boasts of native poets and orators; and the progress of the sciences is supported by the institution of numerous academies.

EDUCATION. The manner of education has, as usual, been neglected by travellers and geographers, though perhaps one of the most important branches in the whole circle of human affairs. Compared with this primary foundation, an enumeration of universities is of small consequence.

UNIVERSITIES. That of Upsal is the most ancient and renowned, containing about 500 students; while that of Lunden presents about 300. A third is at Abo in Finland, frequented even by students from Russia; and the whole number is computed as equaling that of Upsal. There are besides twelve literary academies, most of which publish memoirs of their transactions. The library at Upsal is richly furnished with books remitted by Gustaf Adolph, when his victorious arms penetrated deeply into Germany; Sweden having thus acquired by war the first materials of her literary fame.

CITIES AND TOWNS. Stockholm, the capital of Sweden, stands in a singular situation between a creek, or inlet, of the Baltic sea, and the lake Mæler. It occupies seven small rocky islands, and the scenery

is truly singular and romantic. "A variety of contrasted and enchanting views is formed by numberless rocks of granite, rising boldly from the surface of the water, partly bare and craggy, partly dotted with houses, or feathered with wood*." Somewhat resembling Venice, but with greater diversity of prospect, it requires no fortifications. Most of the houses are of stone or brick, covered with white stucco; except in the suburbs, where several are of wood painted red, as usual in the country of Sweden. This city was founded by the earl Birger, regent of the kingdom, about the middle of the thirteenth century; and in the seventeenth century the royal residence was transferred hither from Upsal. The entrance to the harbour is through a narrow streight, of somewhat difficult access, especially as there are no tides: and for four months in the year it is frozen. It is however deep, and capable of receiving a great number of vessels. The royal palace stands in a central and high situation; and there are a castle, an arsenal, and several academies. The manufactures are few, of glass, china, woolen, silk, linen, &c. By the latest accounts, the population of Stockholm may be estimated at 80,000.

UPSAL. Next in dignity is Upsal, the only archbishoprick, and formerly esteemed the chief city of the kingdom; but at present the inhabitants, exclusive of the students, do not exceed 3000†.

GOTHENBURG. Gotheburg, or Gothenburg, in the province of West Gothland, is esteemed the second city in Sweden, having a population of 20,000, though it was only founded by Charles IX, or rather by Gustaf Adolph. Besides considerable commerce, the herring fishery contributes to enrich Gothenburg‡. The streets are uniform; and the circumference is computed at near three miles: but the fortifications are so weak, that in 1788, it must have fallen into the hands of the Danes, had it not been for the interference of foreign powers.

CARLSKRONA. Carlskrona was founded by Charles XI, in 1680. This city, and Stralsund, in Swedish Pomerania, are supposed each to contain about 11,000 inhabitants. Abo, in Finland, is computed at 8,750; in which number it is nearly rivalled by Nordkioping. Fahlun is the next in population; and is followed by Wismar, another town possessed by Sweden, on the northern shore of Germany. None of the other towns contain more than 4,000 inhabitants.

EDIFICES. Even including the royal palaces, Sweden cannot boast of many splendid edifices. The roads are in general far superior to those of Denmark and Norway, which seem unaccountably neglected, good roads being the very stamina of national improvement. Yet the internal communication, even in Sweden, is impeded by bad arrangements||.

INLAND NAVIGATION. Of late a laudable attention has been paid to inland navigation; and the chief effort has been to form a canal between Stockholm and Gothenburg. In this canal, styled that of Trolhattan, conducted along the river Gotha, stupendous excavations have been made through the granitic rocks, in order to avoid cataracts;

* Coxe, iv. 33. See also Marshall, ii. 300. † Ib. iv. 175. ‡ Ib. iv. 323.
|| Olivarius Le Nord. Lit. No. 12.

one of which, of more than 60 feet, is called the Infernal Fall. Yet the plans have repeatedly failed, from the ignorance of the engineers; and the first expense ought to have been to procure a superintendant of real skill from England. The intention was to conduct an inland route from the Meler lake, to that of Hielmer, and thence to that of Wener; and by the river Gotha, an outlet of the latter, to the Shagger Rack and German sea. This grand design is already in some measure completed; and in the year 1800, the rivers and old canals of Finland were ordered to be cleared; but in that region the ice affords the easiest mode of communication.

MANUFACTURES AND COMMERCE. The Swedish manufactures are far from being numerous, consisting chiefly of those of iron and steel; with cloths, hats, watches, and sail-cloth. The manufactures of copper and brass, and the construction of ships, also occupy many hands. In 1785, it was computed that 14,000 were employed in those of wool, silk, and cotton. Of native products exported, iron is the most considerable; and it is said that the miners in that kingdom are about 25,600.

The commerce of Sweden rests chiefly on the export of their native products, iron, timber, pitch, tar, hemp, and copper. Herrings also form a considerable article. Part is also transferred to other nations, of the goods imported by Swedish merchants, from the isle of St. Bartholomew in the W. Indies, and from China. The chief import is corn of various kinds, particularly rye, Sweden rarely affording a sufficiency for her own consumption; with hemp, tobacco, sugar, coffee, drugs, silk, wines, &c. Mr. Coxe has published a table of the Swedish commerce, whence it appears that the exports then amounted to 1,369,830*l.* 13*s.* 5*d.*, and the imports to 1,008,392*l.* 12*s.* 4½*d.*, so that the balance in favour of Sweden was about 360,000*l.*

CHAPTER IV.

NATURAL GEOGRAPHY.

CLIMATE AND SEASONS.—FACE OF THE COUNTRY.—SOIL AND AGRICULTURE.—RIVERS.—LAKES.—MOUNTAINS.—FORESTS.—BOTANY.—ZOOLOGY.—MINERALOGY.—MINERAL WATERS.—NATURAL CURIOSITIES.

CLIMATE AND SEASONS. THE different parts of Sweden present considerable varieties of temperature, but even in the middle regions, winter maintains a long and dreary sway. The gulf of Bothnia becomes one field of ice; and travellers pass on it from Finland by the isles of Aland. In the most southern provinces, where the grand mass of the population is centered, the climate may be compared to that of Scotland, which lies under the same parallel; but the western gales from the Atlantic, which deluge the Scottish Highlands with perpetual rain, and form the chief obstacle to improvement, are little felt. In the north, the summer is hot, from the reflection of the numerous mountains, and the extreme length of the days; for at Tornea, in Swedish Lapland, the sun is for some weeks visible at midnight; and the winter in return, presents many weeks of complete darkness. Yet these long nights are somewhat relieved, by the light of the moon, by the reflection of the snow, and by the Aurora Borealis, or northern lights, which dart their ruddy rays through the sky, with an almost constant effulgence. Of late years, it has been remarked, that the spring is more cold than formerly; yet at Stockholm, the tulips blow at Whitsunday. Beyond Geffle, fruit trees are rare. In a further latitude, the beech disappears; and the oak dwindles, till it is followed by the birch, a tree which seems the most capable of bearing cold.

FACE OF THE COUNTRY. No country can be diversified in a more picturesque manner, with extensive lakes, large transparent rivers, winding streams, wild cataracts, gloomy forests, verdant vales, stupendous rocks, and cultivated fields.

SOIL AND AGRICULTURE. The soil is not the most propitious; but agriculture is conducted with skill and industry, so as much to exceed that of Germany, and Denmark*. Even Finland presents many rich pastures, and not a few fields of rye, oats, and barley. It is supposed, that in the south of Sweden, by draining and other improvements, a sufficient quantity of wheat might be raised for the supply of the kingdom.

* Marshall, iii. 93.

RIVERS. Sweden is intersected by numerous rivers, the largest of which are, in the native language, called Elbs, or Elfs. The most considerable flow from the lakes, without any great length of course; such as the Gotha, the only outlet of the vast lake of Wener, but unhappily impeded by many rocks and cataracts. Many other rivers in the south, rather assume the form of creeks, and outlets of the lakes, as the Motala, which is the outlet of the lake Weter, passing by Norkioping: and scarcely can a stream be named of considerable course, till we reach the river Dahl, the most important in Sweden, consisting of two conjunct streams, the eastern and western Dahl, which rise in the Norwegian Alps, give name to the province of Dalarn, or Dalecarlia; and after a course of about 260 British miles, enter the Bothnic gulf, about ten miles to the east of Geffle, presenting, not far from its mouth, a celebrated cataract, esteemed little inferior to that of the Rhine at Schaffhausen, the breadth of the river being near a quarter of a mile, and the perpendicular height of the fall between thirty and forty feet*. The surrounding scenery also assists the effect, which is truly sublime.

Further to the north, and in Swedish Lapland, are many considerable rivers, which also rise from the Norwegian Alps, and flow into the gulf of Bothnia, after circuits of about 200 miles.

TORNEA. The chief of the Laplandic streams is the Tornea, which springs from a lake of the same name; and after receiving the Kengis, and other considerable rivers, joins the northern extremity of the Bothnic, having run about 300 British miles.

Finland is sprinkled with numerous lakes, which give rise to considerable streams, but of a short course, as the Ulea; the Cano, which passes by Biormborg; and the Kymmen, flowing into the centre of the gulf of Finland.

LAKES. Few countries can rival Sweden in the extent and number of lakes, which appear in almost every province:

WENER. Of these, the most important is the Wener, which is about 100 British miles in length, by fifty or sixty in breadth, in great part surrounded with forests, and rocks of red granite. It receives twenty-four rivers, abounds with fish, and contains many romantic isles.

WETER. Next is the Weter, a lake of equal length, but inferior in breadth, which seldom exceeds twenty miles. This lake being surrounded with mountains, is particularly subject to storms, in the stillest weather, whence arise many popular tales and superstitions: it contains two remarkable islands; and on the shores are found agates, carnelians, and touch-stones, or pieces of fine basaltes†. The Weter is clear, though deep; and while it receives about forty small rivers, has no outlet except the Motala. On its eastern shore, stands the little town of Wadstena, remarkable for a convent in which was preserved the body of the Swedish Brigit‡.

MELER. The lake Meler, at the conflux of which with the Baltic, is founded the city of Stockholm, is about sixty British miles in length, by eighteen in breadth, and is sprinkled with picturesque isles.

* Wraxall's Northern Tour, p. 158. Coxe, v. 99. † Busching i. 549.

‡ The curious diary of this convent, which consisted of monks and nuns, was published by the learned Benzelius, at Upsal, 1721. 4to.

To the south-west is the lake of Hielmer, more remarkable for its proposed utility in the inland navigation, than for its extent.

Many other lakes are found in the north of Sweden, among which the most considerable is that of Stor, in the province of Jemtia. The chief lake of Lapland is that of Enara, in the furthest north, about seventy British miles in length, by thirty at its greatest breadth. After this, may be named those of Hernasba Staer, or the great lake, Tornea, and others. The lake and mountain of Niemi, and the river Tengilo, which falls into the Tornea, have been celebrated by Maupertuis for their picturesque beauty.

The most considerable lake in Finland is that of Pejend, or Pajana, about eighty miles in length, by fifteen in breadth, and which gives source to the river Kymmen.

SAIMA. The lake of Saima, to the east, is yet more considerable; but it is chiefly within the Russian dominions: this lake may perhaps, with its various creeks and communications, be estimated at 160 British miles in length, by twenty-five at its greatest breadth; and flows into the Ladoga, by the great and noisy current of Woxen, which forms a vast cataract about a mile from its mouth*.

MOUNTAINS. Sweden may be in general regarded as a mountainous country; in which respect it is strongly contrasted with Denmark proper, or Jutland and the Isles. The chief mountains are in that elevated chain which divides Sweden and Swedish Lapland from Norway; from which successive branches run in a south-east direction.

SWUCKU. The mountain of Swucku is supposed to be one of the highest of this chain, and is of a compact slaty free-stone; but on the west, there are masses of a different nature; and where it inclines to the lake of Fæmund, there are apertures from two to four fathoms in width, and of an equal depth, but extending in length from two to three hundred ells†.

MOSSEVOLA. That able author mentions the high mountain of Mossevola, near the same lake, as being formed of a pudding-stone, consisting of balls of free-stone, with a few hornblende and lime-stone, united by a sandy cement‡.

RÆTTVIK. The mountain of Rættvik, he says, is calcareous, and he estimates its height at 6,000 feet above the sea, observing, as a singularity, that upon this mountain and that of Rodaberg, are found vast blocks of reddish felspar, mingled with quartz and brown mica. There also occur, on the mountain of Osmund, enormous fragments of transparent felspar, mingled with quartz and mica; though we must proceed to the high mountains of Norway to find summits more elevated than this last. Orology, or an exact account of mountains, was little studied when Bergmann published this work, about 1770; but it would appear that the granitic ridge of the chain is in Norway; while the flanks, consisting as usual of lime-stone, pudding-stone, and free-stone, verge into Sweden. The centre of the chain seems, as in the

* Busching, i. 674.

† Bergman's Phy. Geog. in the Journal des Mines, xv. xv.: in the French translation, Bergman computes the height of Swucku at 2,268 ells, that is, about 9,072 feet. Ib. p. 65.

‡ Ib. p. 64.

Alps and Pyrenees, to present the chief elevations, whence the mountains decline in height towards Lapland. Those of Finland often contain rapakivi, being a brown mixture of felspar and mica*. In the centre and south of Sweden, the red granite becomes very common. But in Westrogothia, the mountains are often of trap.

Further illustrations of the grand chain of mountains, which divide Sweden from Norway, will be found in the description of the Danish dominions; and in considering the Swedish mineralogy, other hints will arise concerning the geology of the country.

Forests. The forests of this kingdom are numerous, and without their aid, the mines could not be wrought. Dalecarlia, in particular, abounds with forests of birch, poplar, mountain ash, pine, and fir; and the numerous lakes of Sweden, are generally skirted with wood to the margin of the water.

Botany. Although the great Scandinavian peninsula be divided by its political interests between Denmark, Sweden, and Russia, yet nature refuses to acknowledge any such distinction; it shall therefore be considered, with respect to its botany, as one great whole, nor can a sketch of its indigenous plants be introduced any where with more propriety than in the description of that territorial part of it which, in extent, is superior to all the rest, and which reckons amongst its citizens the illustrious Linnæus, and several of his most eminent disciples.

The lowlands and lakes of Scandinavia, are principally situated in the south of Sweden and Finland, and the great ranges of Alpine mountains are found near the Arctic circle, or at least are confined to the northern provinces; hence it is that Lapland, both from its elevation and its northern site, contains several plants which are not to be met with in the rest of the peninsula.

Several species are common both to England and Scandinavia, and though the flora of Britain be the most copious of the two, yet the superiority is not perhaps so great as might be expected from the difference of climate. If those species that are natives of our chalk hills, and southern coasts, are for the most part wanting to Scandinavia, yet this last contains several German and Arctic plants, which are not to be found in our own island.

Of timber trees, there are but few species; the most common, and those which constitute the wealth of Scandinavia, are the Norway pine, and the fir: of these there are immense forests spread over the rocky mountains, and deepening, with their sullen hue, the whole horizon; thousands of giant growth are every winter overthrown by the storms, and allowed to perish where they fall, from the impossibility of transporting them to the sea; others, in more accessible situations, are converted to various human uses; the wood from its lightness and straightness, is excellent for masts and yards, and various domestic purposes; the juice, as tar, turpentine, and pitch, is almost of equal value with the wood; and the inner bark, mixed with rye-meal, furnishes a coarse bread in times of scarcity. The *bird-cherry*, prunus padus; the *white beam*, cratægus aria; the *mountain ash*, sorbus aucuparia; the *alder*, the *birch*, and *dwarf birch*, betula alnus, B. alba, B. nana; several kinds

* Ib. 72. Kirwan, i. 345.

of *willow*; the *aspen*, populus tremula; are found in the whole peninsula; the lime, the elm, the ash, and the oak, though growing with freedom in the southern parts, are incapable of withstanding the rigours of a Lapland winter. Among the larger shrubs, the *German tamarisk*, tamarix Germanica; the *guelder rose*, viburnum opulus; and the *barberry*, berberis vulgaris, are met with chiefly in the south; the *burnet rose*, the *gale*, the *raspberry*, and *juniper*, are hardy enough to flourish even within the Arctic circle. The lower woods and thickets afford the Linnæa borealis, and Trientalis Europæa, in great abundance, and here and there are found the *everlasting pea*, lathyrus sylvestris; the *narrow-leaved willow herb*, epilobium angustifolium; the *mezereon*, Daphne mezereum; the *hepatica*, anemone hepatica; and the cornus Suecica. The fir woods yield two species of pyrola, the rotundifolia, and minor; and the shady sides of mountains and alpine lakes, are adorned by the cerastium alpinum, serratula alpina, sedum rupestre, tussilago frigida, lycopodium complanatum, ranunculus aconitifolius, aconitum lycoctonum, trollius Europæus, *globe flower*; and the splendid pedicularis sceptrum.

The dry rough tracts on the sides of the mountains are covered with the *common* and *fine-leaved heath*, erica vulgaris and tetralix; the *bearberry*, arbutus uva-ursi, distinguished by its scarlet clusters; the *Iceland* and *rein-deer lichen*, the one an article of food to the inhabitants, the other the chief support of the animal whose name it bears; dryas octopetala, *mountain avens*, vaccinium vitis-idæa, rubus saxatilis, rhodiola rosea, and saxifraga cotyledon, *pyramidal saxifrage*. The bleak summits where even the heath cannot root itself, are clothed with the beautiful azalea procumbens, androsace septentrionalis, andromeda hypnoides, and ranunculus glacialis; with the arbutus alpina, lycopodium alpinum, and saxifraga nivalis. The mountain pastures consist for the most part of the phleum alpinum, and other viviparous grasses, mixed with phaca alpina, astragalus alpinus, arnica montana, gentiana purpurea, alchemilla alpina, viola biflora, gentiana nivalis, veronica alpina, and polygonum viviparum.

The moist spungy alpine rocks, and the sides of the torrents afford the *cloudberry*, rubus chamæmorus, one of the most plentiful and grateful of the Scandinavian fruits; thalictrum alpinum; several kinds of saxifrage, especially the cernua and aizoides; juncus trifidus, salix herbacea and reticulata, and anthericum calyculatum. The wet and boggy pastures yield, for the most part, a coarse grass mixed with *cotton rush*, eriophorum, with narthecium ossifragum, pedicularis flammea, andromeda polyfolia, vaccinium oxycoccos, *cranberry*; the fruit of which grows to a larger size than that of the same species in the English mosses, saxifraga hirculus, vaccinium uliginosum, and gentiana pneumonanthe.

The plants which grow in the lakes and pools, covered as they are with ice nearly half the year, are not very numerous; the most important are the *white* and *yellow water-lily*, nymphæa alba and lutea; calla palustris, littorella lacustris, lobelia dortmanna, menyanthes trifoliata, and nymphoides, *buck-bean*, and *fringed water-lily*.

The plants of Lapland may be divided into those which are common to this and to more southern countries, and those which are scarcely

ever met with beyond the limits of the Arctic circle. Among the former may be particularized azalea procumbens, saxifraga cernua, and rhodiola rosea, all growing in immense abundance on the highest mountains; ribes rubrum, *red currant*, vaccinium myrtillus, *whortleberry*, rubus chamæmorus, *cloudberry*, rubus saxatilis, *stone bramble*, the berries of all which are gathered in great quantities, and preserved under the snow till winter, at which time, mixed with rein deers' milk, they form an agreeable variety in the food of the inhabitants: the moist woods are perfumed during the short summer by the *lily of the valley*, convallaria maijalis, and ledum palustre.

The vegetables peculiar to Lapland, and which grow either on the highest mountains, or on the shore of the northern ocean, are diapensia lapponica, andromeda cærulea and tetragona, rubus arcticus, ranunculus lapponicus and hyperboreus, pedicularis lapponica, gnaphalium alpinum, salix lapponum, orchis hyperborea, pinguicula alpina, and azalea lapponica.

Zoology. The Swedish horses are commonly small, but spirited; and are preserved, by lying without litter, from some of the numerous diseases to which this noble animal is subject. The cattle and sheep do not seem to present any thing remarkable. Among the wild animals may be named the bear, the lynx, the wolf, the beaver, the otter, the glutton, the flying squirrel, &c. The rein deer of Lapland is briefly described in the account of the Danish monarchy. Sweden also presents one or two singular kinds of falcons, and an infinite variety of game; among which may be named the kader, or chader, in Scotland called the cock of the forest, being as large as a common turkey, and of a black colour, while the hen is orange, and far inferior in size. The ora is rather larger than our black game. The hierpe is esteemed the most delicate, about the size of a young pigeon, diversified with black, grey, and white. The snoripa makes an extraordinary noise, particularly in the night*. The rana bombina, and the coluber chersea, are considered as almost peculiar to Sweden.

Mineralogy. Of modern mineralogy, Sweden may perhaps be pronounced the parent country; and her authors, Wallerius, Cronstedt, and Bergmann, (not to mention the great Linnæus, who confesses that he had no predilection for this study, perhaps because it was undeterminable by forms and members, upon which his zoology and botany rest,) have laid the first solid foundations of the science. It would therefore be a kind of literary ingratitude not to bestow due attention on Swedish mineralogy.

Gold. First in dignity, though not in profit, are the gold mines of Adelfors, in the province of Smoland. The rock is chiefly a slaty horneblende, in vertical banks, black, deep brown, red, or greenish; sometimes soft like lapis ollaris, sometimes very hard. The veins are generally of quartz, of a dark colour; the direction of the most productive being from north to south, varying in thickness from two inches to near a fathom†. The gold is sometimes native; and sometimes combined with sulphur. Some ores of copper are also found in the vein, which likewise presents white calcareous spar, red zeolites, small

* Consett, p. 71, &c. † Bergmann, Phy. Geog. ut supra p. 49.

red or green fragments of petrosilex, with galena and iron. But these mines are nearly exhausted*.

Silver. In the production of silver, Sweden yields greatly to Norway; yet the mine of Sala, or Salberg, about thirty British miles west of Upsal, maintains some reputation. It is situated in a country rather flat; and towards Norberg the region of the mines is divided, from a mass of petrosilex, by fissures fixed with earth, and little fragments of steatite. The silver is in lime-stone; which, however, when it is large grained and free from mixture, contains no mineral, and is styled ignoble rock; it is on the contrary, metalliferous when fine grained, and mingled with mica†. There are about 100 veins, greater or smaller; and the gangart‡ is of steatite, talc, amianthus, asbestos, horneblende, calcareous spar, and sometimes quartz and beautiful petrosilex. The silver is rarely found native, but is procured from the galena, or lead ore. Silver has also been found in Swedish Lapland.

Copper. The chief copper mines of Sweden are in the province of Dalecarlia. On the east of the town of Falun, is a great copper mine, supposed to have been worked for near 1000 years||. The metal is not found in veins, but in large masses; and the mouth of the mine presents an immense chasm, nearly three quarters of an English mile in circumference, the perpendicular depth being about 1020 feet. About 1200 miners are employed. Copper is also wrought in Jemtland; and at Ryddarhytte is found in iron. Nor is Sweden deficient in lead.

Iron. But iron forms the principal product, and the mine of Danamora is particularly celebrated for the superiority of the metal, which in England, is called Oregrund iron, because it is exported from Oregrund, an adjacent port, where the Bothnic gulf joins the Baltic. The mines of Danamora have no galleries, but are worked in the open air by means of deep excavations**. The ore is in a lime-stone rock, and occupies about 300 persons in twelve pits. This valuable mine was discovered in 1488. Bergmann describes the iron mine of Taberg, in Smoland, as consisting of beds of ore, of a blackish brown, separated by beds of mould, without any stone††. This enormous mineral pile is rivalled by an entire mountain of iron ore near Tornea, in Lapland; and at Luleo, the mountain of Gellivar forms a mass of rich iron ore, of a blackish hue, extending, like an irregular vein, for more than a mile, and in thickness from 300 to 400 fathom‡‡. Cobalt is found at Basna, and zinc at Danamora; while the mines of Sala present native antimony; and molybdena appears at Norberg. Coal has been recently discovered in the province of Scone.

Sweden abounds with beautiful granite; but in marble, yields to Norway. Porphyry also appears in the mountain of Swucku, and many

* Gold is also found in horneblende, at Basna, near Ryddarhytte. Ib. 24.

† Bergmann, Phy. Geog. ut supra, p. 53.

‡ This word, adopted from the German, signifies what was formerly styled the matrix, a term abandoned, because it implied that the mineral was produced by the substance in which it was found.

|| Coxe, v. 94. ** Ibid. v. 103. †† Ut supra, p. 58.

‡‡ In another passage, p. 23, Bergmann observes, that the two mountains of Kerunawara, and Lousowara, in Pitea Lapland, only divided by a little valley, are wholly composed of iron ore.

other parts. At present, when precious stones are radically distinguished from coloured crystals, it would perhaps be difficult to discover any of the former in Sweden. Bergmann celebrates the rock crystals of Offerdals in Jemtland, found in cavities of white quartz, which runs in veins through a rock of lapis ollaris;* but he passes in silence any other Swedish production of this kind, nor does the industrious Wallerius supply this defect, and he only adds coarse garnets of various colours.

MINERAL WATERS. The most renowned mineral waters in Sweden, are those of Medewi, in eastern Gothland.

NATURAL CURIOSITIES. Sweden and Swedish Lapland, abound with natural curiosities, of various descriptions. Some of the lakes and cataracts, have been already mentioned: and it would be vain to attempt to describe the many singular and sublime scenes, which occur in so variegated and extensive a country.

* Journal des Mines, ib. 36.

SWEDISH ISLANDS.

SWEDISH ISLES. SWEDEN possesses many islands, scattered in the Baltic sea, and gulf of Bothnia.

RUGEN. Rugen, the most southerly, affords, as it were, a passage to the Swedish possessions in Pomerania. This isle formerly had its own princes, who afterwards paid homage to the Danes. It was annexed to Sweden by the treaty of Westphalia, and is not a little productive in grain and cattle. Next on the north-east is the isle of Bornholm, an ancient appanage of Denmark, yielded to Sweden in 1658, but soon after restored to Denmark by the wish of the inhabitants, though it be often erroneously described in the maps as belonging to Sweden.

OELAND. Further to the north is the long island of Oland, or Oeland, in length about seventy miles, in breadth about six. In the north are many fine forests, while the southern part is more level and fertile. The horses are small, but strong, and the forests abound with deer, nor is the wild boar unknown. Free-stone, alum, and touch-stone, are products of Oeland; and the inhabitants are computed at near 8000.

GOTHLAND. Next occurs the island of Gothland, known to the literary world by the travels of Linnæus, about seventy miles in length, and twenty-four in breadth; a fertile district, remarkable for an excellent breed of sheep. It was subject to the Danes for near two centuries, till 1645, when it was restored to Sweden. The isles of Aland mark the entrance of the Bothnic gulf, deriving their name from the largest, which is about forty miles in length, and fifteen in breadth, containing about 9000 inhabitants, who speak the Swedish language, though included in the government of Finland. These isles form, as it were, a barrier of rocks of red granite, stretching to the opposite shores.

PORTUGAL.

CHAPTER I.

HISTORICAL GEOGRAPHY.

NAMES.—EXTENT.—BOUNDARIES.—ORIGINAL POPULATION.—PROGRESSIVE GEOGRAPHY.—HISTORICAL EPOCHS AND ANTIQUITIES.

NAMES. THE name of Portugal is of recent origin. In the Roman period, there was a town called *Calle*, now Oporto, near the mouth of the river Douro, and this haven being eminently distinguished, the barbarism of the middle ages conferred on the circumjacent region the name *Porto Calle*; which, as the country was gradually recovered from the Moors, was yet more improperly extended to the whole kingdom*. The ancient name of this country was Lusitania; but the boundaries do not exactly correspond.

EXTENT. Portugal extends about 360 British miles in length, by 120 in breadth; and is supposed to contain about 27,280 square miles, which with a population of 1,838,879, will yield sixty-seven inhabitants to the mile square†. The extent and population thus approach nearly to those of Scotland: but by some accounts, the population of Portugal may exceed the calculation here followed, by nearly half a million.

ORIGINAL POPULATION. The original population of Portugal may be traced in that of Spain, and has undergone the same revolutions. Those who are desirous to inquire further into the subject may consult the learned work of the Portuguese antiquary‡.

* D'Anville Etats formés en Europe, &c. p. 192.
† Boetticher's Tables, p. 46.
‡ Rescudii Antiquitates Lusitaniæ. Col. Agrip. 1600, 12mo.

PROGRESSIVE GEOGRAPHY. The progressive geography of Portugal is also included in that of Spain, till the eleventh century, when it began to form a separate state. The kings of Castile had recovered a small part of this country from the Moors about the year 1050: and the conquest was gradually extended from the north till about the middle of the thirteenth century, when the acquisition of Algarve completed the present boundaries of Portugal.

HISTORICAL EPOCHS. The historical epochs of so recent a state cannot be numerous; nor is it necessary to recur to those ancient events, which more properly belong to the general history of Spain.

1. The kings of Austrias subdue some of the Moorish chiefs of the north of Portugal: and Alphonso the Great establishes episcopal sees in the part between the Minho and Douro. In 1054, Ferdinand king of Castile extends his conquest to Coimbra; and on sharing his dominions among his sons, Don Garcia, along with Galicia, had a part of Portugal, whence he is styled on his tomb, A. D. 1090, *Rex Portugalliæ et Galleciæ**.

2. Alphonso VI, brother of Garcia, and king of Castile, having favourably admitted several French princes to his court, among them was Henry, whom he nominated count of Portugal, adding his natural daughter Theresa in marriage. The most exact French writers assert, from the chronicle of Fleury, that this Henry was the grandson of Robert duke of Burgundy, son of Robert king of France; and deserve more credit than the Spanish, who derive him from the house of Lorrain, through a relation of Godfrey of Boulogne, the hero of Jerusalem; a manifest error, as Godfrey of Boulogne, though he held the duchy of Lorrain, was not of the house of Lorrain. However this be, Henry appears as Count of Portugal in 1094 or 1095: signalized himself by many victories over the Moors, and died in 1112, leaving a son Alphonso the first. In the year 1139, Alphonso gains an illustrious victory over five Moorish princes, and is acclaimed king by his troops upon the field of battle. In 1148 he seizes Lisbon by the assistance of a fleet of Crusaders going to the Holy Land. Alphonso died in the year 1185, aged upwards of ninety. Such are the foundations of the Portuguese monarchy.

3. Alphonso III, about the year 1254, completes the conquest of Algarve. Portugal continued to be fortunate in a succession of great princes; but the wars against the Moors were unhappily followed by those against the kings of Castile, which have implanted such a deep hatred between the nations.

4. Portugal was to attract the admiration of Europe by her commercial discoveries. In 1415 John the Great, king of Portugal, carrying his arms into Africa, and taking the city of Ceuta, an impulse was given to the national spirit; and in 1420 we find the Portuguese in possession of Madeira. Emulation also contributed, for in 1402, Jean de Bethencourt, chamberlain of Charles VI, of France, had taken possession of the Canaries, and afterwards assumed the title of king of those islands†. The Portuguese discoveries in Africa proceeded under

* D'Anville, 194.

† See the History written at the time by his Chaplains, published at Paris 1630, 8vo.

John's successors, Edward, and Alphonso V, and the auspices of Prince Henry, till, in the reign of John II, they extended to the Cape of Good Hope: and in that of Emanuel, Vasco de Gama opened the East Indies.

5. John III, admits the inquisition, A.D. 1526; since which event the Portuguese monarchy has rapidly declined.

6. Sebastian king of Portugal, leads a powerful army on an idle expedition into Africa, and is slain in battle. He is succeeded by his uncle Cardinal Henry; who dying two years afterwards, Portugal was seized by Philip II, king of Spain, 1580.

7. The revolution of 1640, which placed the house of Braganza on the throne of Portugal. John IV, was a descendant of the ancient royal family, by the female line. Little of consequence has since arisen, except the earthquake at Lisbon, in 1755, and the recent intermarriages with Spain, which promise, at no remote period, to unite the kingdoms. The recent peace with Spain seems to have been procured by humiliating concessions.

ANTIQUITIES. The antiquities of Portugal consist chiefly of Roman monuments, with a few Moorish remains. In the furthest north is an extensive series of arches, formerly a Roman aqueduct*. At Evora are well preserved ruins of a temple of Diana, and an aqueduct ascribed to the celebrated Quintus Sertorius, whose life is delineated by Plutarch†. Among the antiquities of the middle ages may be named the noble monastery of Batalha, in Portuguese Estremadura, about sixty miles to the north of Lisbon, founded by John I, at the close of the fourteenth century, in consequence of the great victory over the king of Castile, one of the most noble monuments of what is called the Gothic style of architecture‡.

* Murphy's Travels.

† At Chaves is a Roman Bridge, erected in the time of Trajan, and still entire.

‡ See the minute description by Murphy.

CHAPTER II.

POLITICAL GEOGRAPHY.

RELIGION.—ECCLESIASTIC GEOGRAPHY.—GOVERNMENT.—LAWS.—POPULATION.—COLONIES.—ARMY.—NAVY.—REVENUES.—POLITICAL IMPORTANCE AND RELATIONS.

RELIGION. THE religion of Portugal is the Roman Catholic; and a strict observance of its duties forms one of the national characteristics, the men vying with the women in attention to their repeated daily devotions. There are two archbishopricks, and ten episcopal sees: and there is besides a patriarch, but he does not seem to possess extraordinary powers. The number of parishes approaches four thousand*; while in Scotland, a country of similar extent, they do not reach one thousand: but the catholic religion affords supplies for a far greater number of priests, than the protestant.

GOVERNMENT. The constitution of Portugal is a monarchy, absolute and hereditary; yet in case of the king's demise without male issue, he is succeeded by his next brother, whose sons have, however, no right to the throne till confirmed by the states†.

LAWS. The chief articles of the constitution are contained in the statutes of Lamego, issued by Alphonso I, in 1145. The king's titles are numerous; that of the heir apparent is prince of Brazil; his eldest son prince of Beira. The laws have few particularities; they are lenient in cases of theft, which must be repeated four times before death be the punishment. An adultress is condemned to the flames: but this like other laws too severe for the offence, is never put in execution.

POPULATION. Portugal is divided into six provinces. 1. Entre Douro é Minho. 2. Tras-os-Montes. 3. Beira. 4. Estremadura. 5. Alentejo. 6. Algarve. The two first being on the north of the kingdom, the next two in the middle, the two last in the south. The first province derives its name from its situation, between the rivers Douro and Minho, and is very populous and fertile. The second is mountainous, as the name imports; but there are vales which contain vineyards, and other cultivated lands. Beira is a large and fertile province; and is rivalled in soil by Estremadura, which, like the Spanish province of the same name, is said to derive its etymon from having been extreme frontiers towards the Moors in the south. Alentejo having been most exposed to the attacks of the Spaniards, is defective in population. Algarve is a very small division, which has, however,

* Murphy's State of Portugal, p. 10.
† Ib. 109, from the Portuguese writers.

the honour of forming an addition to the royal titles, as Navarre to that of France; those minute provinces having been comparatively recent acquisitions. The population of the whole is, according to Boetticher, 1,838,879; but by Murphy's statement 2,588,470. As this last is derived from Portuguese authors, who have little skill in statistics, it seems to be exaggerated as usual in such cases.

COLONIES. The chief colony from Portugal is that established in Brazil; and they still retain many settlements on the coast of Africa, with Goa and Macao in the East Indies, the relics of great power and territory*.

ARMY. The army is only computed at about 24,000; and the militia might perhaps amount to as great a number.

NAVY. The naval power, once considerable, is reduced to thirteen sail of the line, and fifteen frigates†.

REVENUES. The revenue is calculated at 2,000,000*l.* sterling, and the gold of Brazil mostly passes to England in return for articles of industry.

POLITICAL IMPORTANCE AND RELATIONS. Portugal retains small influence in the political scale of Europe. Her commerce is almost wholly dependant on England; but by land she is exposed to no danger except from Spain, or by the consent of Spain. The union of the two countries would doubtless be advantageous to both; but might prove detrimental to English commerce, and the weight of England in the Portuguese councils would infallibly subside.

* Madeira has been recently seized by an English force.
† Murphy, 119.

CHAPTER III.

CIVIL GEOGRAPHY.

MANNERS AND CUSTOMS.—LANGUAGE.—LITERATURE.—EDUCATION.—UNIVERSITIES.—CITIES AND TOWNS.—EDIFICES.—INLAND NAVIGATION.—MANUFACTURES AND COMMERCE.

MANNERS AND CUSTOMS. THE manners and customs of the Portuguese are discriminated into those of the northern and southern provinces, the former being more industrious and sincere, the latter more polite and indolent. In general the Portuguese are an elegant race, with regular features, embrowned by the sun, and dark expressive eyes. The prejudices of nobility are as common and pernicious in Portugal as in Spain: nor is that general intercourse found which imparts knowledge and vigour to society. All ranks seem fond of retirement and silence, and little inclined to social pleasures. The women are commonly of small stature, yet graceful and beautiful. Like other southern nations, the Portuguese esteem a plump roundness of the limbs; nor is the green, or rather sea-green eye, so much applauded by the European poets of the middle ages, without its share of modern admiration*. Ladies of rank still imitate the industry of their ancestors in spinning flax from the distaff; and the oriental manner of sitting on cushions on the floor, is often practised. The dress resembles the Spanish, but the men prefer the French, with the exception of a large loose cloak. The peasantry remain miserable vassals of the Fidalgos, or gentlemen.

In diet the Portuguese are temperate, or rather abstemious; and the beauty of the climate induces them to spend most of their time in the open air, a house being little more than a conveniency to sleep in.

MANNERS AND CUSTOMS. The games are billiards, cards, and dice. The common people fence with a quarter staff; but the chief amusement consists in the bull fights, already described in the account of Spain. The arts and sciences are almost entirely neglected, except by a few among the clergy.

* Murphy, 139. The French poets are full of yeux verds. Drummond of Hawthornden (Letters p. 252.) praises the green eye; which is still found even in the Orkneys, as appears from the Transactions of the Scottish Antiquaries, vol. i.

LANGUAGE. The Portuguese language is more remote from that of Castile than might be expected from the circumstances. As the royal race was of French extract, it is supposed that many of the words are derived from the Limosin and other dialects of the south of France. It is a grave and solemn speech; but would have been little known among foreigners, had it not been diffused by the fame of the Lusiad.

LITERATURE. The literature of Portugal may be said to commence with Deniz, the sixth sovereign, who cultivated poetry and the belles lettres, and founded the university of Coimbra. In his reign lived Vasco Lobeira, who is said to have been the original author of that famous romance Amadis de Gaula. In more recent times, Saá da Miranda has acquired reputation in pastoral poetry. The chief historians are Joaõde Barros, Fr. Luiz de Sousa, Fr. Bernardo de Brito Vieira, Osorio bishop of Sylves, Duarte Ribeiro de Macedo, the venerable Bartholomeo de Quartal, and the count de Ericeira*. Among the poets are celebrated, Camoens, Digo Bernardes, Antonio Barboza, Bacelar, and Gabriel Pereira: two dramatic writers are also mentioned, Vicente Antonio Josephar, whose plays are published in four volumes; and Nicola Luis, called the Portuguese Plautus. In mathematics, Pedro Nunez distinguished himself at the beginning of the sixteenth century. Of late years natural history begins to be a little studied; but Portugal is the last of nations in that department.

EDUCATION. Education seems greatly neglected in Portugal, though the university of Coimbra be of ancient date.

UNIVERSITIES. The university of Evora was founded in the year 1553; and a college at Mafra in 1772. The royal academy is of recent erection, and the design aspires to considerable public utility.

CITIES AND TOWNS. Lisbon, the capital city of Portugal, was called by the ancients Ulyssippo, and the foundation fabulously ascribed to Ulysses. The situation is grand, on the north side of the mouth of the Tago, and is sheltered on the north-west by a ridge of hills. The haven is capacious and excellent. This capital was regained from the Moors in the twelfth century, as already mentioned. The population is computed at about 200,000. The earthquake of 1755, a dreadful and memorable epoch among the inhabitants, has contributed to the improvement of the city, the new streets being broad and well paved, resembling those in the west end of London. For constant residence the ladies prefer the attic floors; and ventilation and coolness are chiefly consulted, grates being almost unknown; while in winter a warm cloak supplies the place of a fire†. There is no court end of the town; and the finest streets are inhabited by tradesmen. There are public walks, two theatres, and a circus for the bull feats. The patriarchal church is singularly magnificent; and the revenue is computed at 114,000*l*. The English have an open burial ground, in which are deposited the remains of the celebrated Henry Fielding, an author unrivalled in the just delineation of life. The royal monastery of Belem, founded by king Emanuel, in 1499, stands about five miles south-west

* Murphy, 157. † Murphy's Travels in Portugal, 148.

of Lisbon; and to the north is a noble modern aqueduct completed in 1732. The consumption of butchers' meat at Lisbon in 1789 was, 27,985 oxen, 1,279 calves, 27,562 sheep, 11,927 hogs.

Oporto. The next considerable town, especially in the eye of strangers, is that of Oporto, seated on the north side of the river Douro about five miles from the sea, upon the declivity of a hill, so that the houses rise like an ampitheatre. The streets are however narrow, and the houses ill constructed. The churches are of little note. The British factory is a large and neat building. The chief exports are wine, oranges, lemons, &c., and linen cloth to the American colonies in Brazil.

Braga. Braga is another considerable town in the same province: and in the second northern division are the towns of Miranda and Braganza, the last of which conferred the ducal title on the present reigning family.

In the province of Beira is the venerable city of Coimbra, with its ancient university. Alentejo contains the city of Ivora, rather of ancient fame than of modern consequence. Tavora, the principal town of Algarvé, does not exceed 5000 inhabitants.

Edifices. The chief edifices of Lisbon are the cathedral, and monasteries, formerly mentioned. The nobility, as in Spain, crowd to the capital, whence the country is little decorated with villas. In the mountains of Cintra, the furthest western extremity of Europe, about twenty miles west of Lisbon, is placed a remarkable monastery, 3000 feet, as is said, above the sea, towards which there are remains of ancient buildings, and a curious bath replenished by a never failing spring. On the east of the mountain is a summer place of Moresque architecture. The environs are rich and delightful, supplying most of the fruits and greens used at Lisbon. Here is also a small vineyard, that of Carcavella, yielding a peculiar grape, which gives name to our Calcavella, a wine generally fabricated in London*.

Inland Navigation. Portugal seems to have paid no attention whatever to the construction of canals; nor perhaps are they found indispensable in a country abounding with rivers, and bordered with an ample extent of sea coast.

Manufactures and Commerce. The Portuguese manufactures are few and unimportant: hats and paper have been lately fabricated at Lisbon; but the chief manufactories are those of woolen cloth at Covilham, Portalegre, and Azeitaon.

A considerable commercial intercourse subsists with England; but the balance in favour of the latter appears to be about 400,000*l.* sterling: and Ireland gains by her exports about 63,000*l.* annually†. The Falmouth packets bring frequent remittances of bullion, coin, diamonds, and other precious stones; and for a considerable time the Portuguese gold money was current in England. Besides woolens and hardware, England transmits to Portugal large cargoes of salted and dried fish, the last article to the annual amount of about 200,000*l.* The exports of Portugal are chiefly wine, oil, oranges, lemons, figs, sugar, cotton,

* Murphy's Travels in Portugal, 241, &c.
† Murphy's State, 62.

cork, drugs, and tobacco. Portugal also maintains a considerable trade with her flourishing colony in Brazil, the inhabitants of which are computed at 900,000. The articles exported to America are chiefly woolens, linens, stuffs, gold and silver lace, fish dried in Portugal, hams, sausages, &c., with glass manufactured at Marinha. Brazil returns gold, silver, pearls, precious stones of various descriptions, rice, wheat, maize, sugar, molasses, ornamental timber, and many other articles rather curious than important. The drugs, spices, and articles used in dying, must not however be omitted. The trade with the East Indies is inconsiderable; and that with the other European nations scarcely deserving notice: it is chiefly with Holland, France, Denmark, and Germany. Some trade is also carried on with the American states.

CHAPTER IV.

NATURAL GEOGRAPHY.

CLIMATE AND SEASONS.—FACE OF THE COUNTRY.—SOIL AND AGRICULTURE.—RIVERS.—LAKES.—MOUNTAINS.—FORESTS.—BOTANY.—ZOOLOGY.—MINERALOGY.—MINERAL WATERS.—NATURAL CURIOSITIES.

CLIMATE AND SEASONS. THE climate of Portugal is familiarly known to be most excellent and salutary. At Lisbon the days of fair weather are computed to amount to 200 in the year; and those of settled rain seldom exceed eighty. The medial heat is generally about 60°*.

FACE OF THE COUNTRY. The face of the country is generally fertile, though with many aclivities; and in the north-east corner there rises a considerable cluster of mountains, seemingly unconnected with the great Spanish chains. The numerous vineyards, and groves of orange and lemon trees, conspire with the chrystal streams, and verdant vales, to impart great beauty and diversity to this favoured country.

SOIL AND AGRICULTURE The soil, like that of Spain, is generally light; but the agriculture in rather a neglected state: and the farmers have a singular prejudice that soils of different qualities are equally adapted to any vegetables. The ground is rather scratched than ploughed, and is sown immediately; nor is the operation of the harrow much regarded. Meadows are little known, except in the north-west province between the Douro and the Minho; and many fine vales remain in a state of nature. The streams having generally a considerable fall, and the rains being violent, though rare, the crops are sometimes destroyed by the force of the torrents.

RIVERS. The rivers of Portugal have been already enumerated in the description of Spain. The Tajo is here a noble stream, and its estuary near Lisbon affords a capacious haven, from two to nine miles in breadth. Among the native streams may be named the Mondego which passes by Coimbra; the Soro which runs into the Tajo; and the Cadaon which forms the harbour of Situval.

LAKES. Scarcely a lake can be traced in the map of Portugal; but some small pools have become remarkable from circumstances such as the Escura, situated on the summit of the mountain of

* Murphy's Trav. 220.

Estralla in the province of Beira, and which is covered with snow during the greater part of the year. This small lake is noted for a profound vortex, by the Portuguese writers who are fond of fable, and little versed in the philosophy or history of nature. Another deep pool occurs near the village of Sapellos, which is said to have been the shaft of a gold mine worked by the Romans. The lake of Obidos, in the Estremadura, is sometimes open to the sea, and at other times closed with sand: it contains variety of excellent fish.

MOUNTAINS. The mountains of this kingdom have not been exactly described. Those in the north-east seem an unconnected cluster, as already mentioned: but the Spanish chain to the north of Madrid, called by some the mountains of Idubeda, enters Portugal near the town of Guarda, and pursues its former course to the south-west.

ARRABEDA. The chain of Arrabeda, in Estremadura, seems a branch or continuation of this: it is chiefly calcareous, and affords beautiful marble. The chain of Toledo appears, as not unusual with the most extensive ranges, to subside before it enters Portugal. In the province of Alentejo is however a small chain, seven leagues in length by two and a half in breadth, running between the city of Ivora and town of Estramas, which, may be regarded as belonging to the chain of Toledo. Estrala, already mentioned, gives source to the Mondego, and two other rivers, and belongs to the first mentioned chain. Monte Junto, the ancient Sagrus, is in Estremadura: its verdure affords a rich pasturage, and the breed of horses was formerly celebrated.

ZOOLOGY. The zoology of Portugal may be regarded as the same with that of Spain*. The horses are however much inferior, but the mules are hardy and strong. The oxen are sometimes equal in size to those of Lincolnshire; but even cows are rare, as the natural pasture is injured by the climate, and no attention is paid to artificial meadows†. The sheep are also neglected, and far from numerous; but swine abound, and are fed with excellent acorns, so that the Portuguese hams are deservedly esteemed.

MINERALOGY. The mineralogy of Portugal has been almost as much neglected as the agriculture. In the two northern provinces are seen immense mines, supposed to have been worked by the Romans, being perhaps the mines in the north of Lusitania mentioned by ancient authors†. The mouth of the largest, cut through the solid rock, is a mile and a half in circumference, and upwards of 500 feet deep: at the bottom it measures 2,400 feet by 1,400. Many subterranean passages pierce the mountain like a labyrinth, and the whole works are on the grandest scale. Other ancient mines are also found in these provinces. Nor were these mines wholly neglected in the middle ages; for there is an ordinance of King Deniz, in favour of those who were employed in the gold mines of Adissa near the mouth of the Tajo‖. But as the operations were attended with great expense, they were abandoned soon after the discovery of the Cape of Good Hope, it being found more profitable to import the metals from

*For the Botany see Spain. † Murphy's State, 25. ‖ Ib. 46.

India, and afterwards from Brazil. Small veins of gold have been observed in the mountains of Goes and Estralla; and it is still found in the sand of some streams, as in ancient times the Tajo was celebrated for this metal. Under the domination of the Spaniards a mine of silver was worked, not far from Braganza, so late as the year 1628. Tin was also found in various parts of the northern provinces; and near Miranda there was formerly a royal manufactory of pewter. There are lead mines at Mursa, Lamego, and Cogo, and the gallena ore is very productive of silver; copper is found near Elvis and in other districts. The iron mines are neglected, from a deficiency of fuel; though coal be found in different parts of the kingdom, and that of Buarcos supply the royal foundery at Lisbon. This bed of coal is about three feet six inches broad, and enlarges according to the depth. Emery is found near the Douro; and many beautiful marbles abound in this kingdom. The mountains of Goes, and others, produce fine granite: and talc occurs near Oporto. Amianthus is discovered in such quantities, that it has been recommended to the artillery in the form of incombustible paper. The felspar of Estralla, mingled with white clay, has been found to compose excellent porcelain. Fullers' earth occurs near Guimerans. Portugal also boasts of antimony, manganese, bismuth, and arsenic; and near Castello-Branco are mines of quicksilver. Rubies have been discovered in Algarve; jacinths in the rivers Cavado and Bellas; beryl or aquamarine in the mountain of Estralla. In short Portugal abounds with minerals of most descriptions; and nothing is wanting but fuel and industry.

Mineral Waters. Nor is there any defect of mineral waters of various kinds. The baths of Caldas da Rainha, in Estremadura, are the most celebrated; and the next are those of Chaves. Salt and petrifying springs also appear; and others to which the ignorance of the Portuguese has ascribed wonderful qualities, which are dismissed from the modern school of natural knowledge.

Natural Curiosities. Many of these have been classed among the natural curiosities of the kingdom, as well as some of the lakes and mountains. On the north bank of the River Douro is a high massy cliff, with engraved letters or hieroglyphics, stained with vermilion and blue; beneath which is a grotto, supposed to abound with bitumen, which proved fatal to the parish priest in his attempt to explore it in 1687. Some petrifying caves, &c., will not now be admitted to the rank of natural curiosities. Striking and singular scenes of rock, water, and ever-green groves, abound in this beautiful country.

SWISSERLAND.

CHAPTER I.

HISTORICAL GEOGRAPHY.

NAMES.—EXTENT.—BOUNDARIES.—ORIGINAL POPULATION.—PROGRESSIVE GEOGRAPHY.—HISTORICAL EPOCHS AND ANTIQUITIES.

NAMES. THE provinces, now known by the collective name of Swisserland, were in ancient times distinguished by several appellations. By the Romans they were regarded as a part of Gaul; and the chief possessors were the Helvetii on the west, and the Rhæti on the east; the chief city of the Helvetians being Aventicum, now Avenche. After the fall of the Roman empire, this interesting country may, in a general point of view, be considered as possessed by the Alemanni on the east, who also held Swabia, and Alsace; and on the west as a part of Burgundia, the inhabitants being styled *Burgundi trans Jurenses*, because, with regard to France, they were situated on the other side of the mountains of Jura*. Divided among several lords, secular, and spiritual, the inheritances of the former at length chiefly centered in the house of Hapsburg, afterwards the celebrated family of Austria; and on its emancipation in the beginning of the fourteenth century first appeared the modern denomination of Swisserland, either derived from the canton of Schweitz, distinguished in that revolution; or from the general name of Schweitzers, given by the Austrians to this Alpine people. For the sake of precision, modern writers restrict the orthography of Schweitz and Schweitzer to the canton; while the general

* D'Anville Etats form. en l'Europe, p. 13. 93.

appellation for the people is the Swiss, and for the country Switzerland, or Swisserland.

EXTENT. In length, from east to west, Swisserland extends about 200 British miles; and in breadth, from north to south, about 130. The contents in square miles have been estimated at 14,960; but a great part is lost to human industry, consisting of vast rocks, partly covered with eternal ice and snow. Even of this country, the boundaries are rather arbitrary than natural, though on the west, mount Jura forms a grand division from France, and on the south, the Pennine Alps, a partial barrier from Italy. On the east lies the Austrian territory of Tyrol, and on the north is Swabia, containing, as it were, an excrescence of Swisserland, on the other side of the Rhine, the small canton of Schaffhausen.

ORIGINAL POPULATION. The original population is thought to have been Celtic; and it was reported, that at the beginning of the last century, the people of a small district used a language resembling the Welch. Yet it would be difficult, either from history, or from ancient appellations, to trace the residence of the Celts in Swisserland; and there is every reason on the contrary to believe that the Helvetians were a Gothic race, a very ancient colony of Germans. Cæsar, who first disclosed the various races of men who inhabited Gaul, nowhere throws a positive light on this subject; but when he describes Celtic Gaul as beginning beyond the Rhone, it follows, that he did not regard the Helvetii as Celts; and the proximity of Germany must induce us to consider the Helvetians as a German people. In the curious collection of Goldastus* there are several glossaries, and fragments of the ancient language used in this country, even in the eighth century, which thence appears to have been pure Gothic, without any Celtic admixture. The Rhæti on the east, are said to have been a Tuscan colony; but a faint resemblance in manners, sometimes led the ancients to rapid conclusions. It is difficult to conceive how the polished Etrurians should take refuge in the midst of barbarous nations, or why no remains of Tuscan buildings or art, have been discovered in this their supposed habitation.

PROGRESSIVE GEOGRAPHY. The progressive geography of Swisserland may be traced with considerable clearness from the contest of Cæsar with the Helvetians, through the classic, Francic, and native historians to the present time.

HISTORICAL EPOCHS. The chief historical epochs may be arranged in the following order:

1. The wars with the Romans; the subjugation of the Helvetii, and Rhæti, and the subsequent events, till the decline of the Roman empire in the west.

2. The irruption of the Alemanni, in the beginning of the fourth century, who are by some supposed to have extirpated the ancient Helvetians.

3. The subjugation of the western part of Swisserland as far as the river Reuss, by the Franks, who annexed that portion to Burgundy.

* Rerum Alamannicarum Scriptores, 1661, fol.

The Grisons on the east, were subject to Theodoric, and other kings of Italy.

4. The conversion of the country to Christianity by the Irish monks, Columbanus, Gallus, and others, in the beginning of the seventh century.

5. The invasion of Alemannia by the Huns*, in the year 909; and the subsequent contests with these barbarians, till the middle of that century. The history of the abbey of St. Gal at this period is interesting, both in a literary point of view, and from the singularity of the events: it was ravaged by the Huns, who were afterwards defeated by Conrad king of Burgundy, about the year 928. See the collection of Goldastus.

6. About the year 1030, the provinces which now constitute Swisserland, began to be regarded as a part of the empire of Germany; and in the course of two centuries, they gradually became subject to the house of Hapsburg.

7. The commencement of the Swiss emancipation, A. D. 1307; and the subsequent struggles with the house of Austria.

8. The gradual increase of the confederacy, the Burgundian and Swabian wars; and the contests with the French in Italy.

9. The history of the reformation in Swisserland.

10. The insurrection of the peasants of Bern, in the middle of the seventeenth century.

11. The dissolution of the confederacy by the French invasion, A. D. 1798.

ANTIQUITIES. The ancient monuments of Swisserland are not numerous, consisting chiefly of a few remains of the Romans, at Aventicum and Vindernissa. Some also occur at Ebrodunum, or Yverdun, and at Baden, the ancient Thermæ Helveticæ. Of the middle ages are many castles, churches, and monasteries, the most noble among the latter being the abbey of St. Gal, the library of which supplied the manuscripts of three or four classical authors, nowhere else to be found. Some interesting monuments relate to the emancipation of the country, and have contributed to extend the spirit of freedom from generation to generation.

* The Ugurs, so called by the writers of the time. They were a branch of the Voguls, a Finnish race.

CHAPTER II.

POLITICAL GEOGRAPHY.

RELIGION.—ECCLESIASTIC GEOGRAPHY.—GOVERNMENT.—LAWS.—POPULATION.—COLONIES.—ARMY.—NAVY.—REVENUES.—POLITICAL IMPORTANCE AND RELATIONS.

RELIGION. THE religion of the Swiss countries is in some the Roman Catholic, in others the Reformed. Of the former persuasion are Uri, Schweitz, Underwalden, cantons which founded the liberty of the country, with Zug, Lucerne, Friburg, Solothurn, part of Glarus, and Appenzel. In these are found six bishopricks, and one metropolitan see. The reformed cantons are of the Calvinist, or Presbyterian persuasion; being the rich and extensive canton of Berne, with Zurich, Basel, or according to the French enunciation, Basle, Schaffhausen, the greatest part of Glarus, and some portions of Appenzel. The country of the Grisons is chiefly Protestant; and Vallais, an ally of the thirteen cantons, has been the scene of atrocious persecutions on account of its disaffection from the Catholic faith: but the inhabitants, to the amount of about 100,000, now profess the Roman Catholic system. In general, the two persuasions live in the most amiable unity and moderation.

GOVERNMENT. The government of Swisserland has been a fertile theme of discussion, from the time of Burnet and Stanyan, to the modern description of that able traveller Coxe. The more powerful cantons of Bern, Zurich, Lucerne, and Friburg, had retained much of the feudal aristocratic form: and the insurrection of the peasants, in the middle of the seventeenth century, unites, with repeated discontents, to convey no high practical eulogy on the constitution, as these simple and honest vassals were not influenced by theories of sedition, but acted solely from their own feelings of oppression. In the eye of the most candid observers, the aristocracy had degenerated into a venal oligarchy, more intent on procuring the lucrative governments of the Bailliages, than on the promotion of the general advantage. The other cantons were more democratic; but the recent subversion of the government by the French, has for some time reduced Swisserland to a dependent province, with new divisions and arrangements, which, as they may prove of very short duration, it is unnecessary here to describe.

LAWS. The laws, of course, partook of the nature of the government of each canton; and under the aristocracies was sufficiently

jealous and severe. Yet Swisserland was one of the happiest countries in Europe; and recommended itself to the most intelligent observers equally by moral and by physical grandeur and beauty.

POPULATION. The population of this interesting country is generally computed at 2,000,000, or about 130 to the square mile. But so large a portion is uninhabitable, that on the subtraction of such parts, the number might be about 200 to the square mile.

ARMY. The military force was reckoned at about 20,000; but in the late struggle with France, this force appears to have been divided, and little effectual. The Swiss regiments in foreign service were computed at twenty-nine; but they returned weakened in frame and morals, and seldom proved serviceable to the state. The permission to serve in foreign countries has been loudly blamed, as a moral deformity; but when we consider the poverty and population of Swisserland, we may conceive, that the want of native resources, conspired with the ambition and curiosity, interwoven with the character of man, to stimulate the youth to this path of instruction and preferment, while the government only connived with the national wish.

REVENUE. The ruinous effects of French extortion cannot be divined; but the revenue of Swisserland was formerly computed at somewhat more than a million sterling, arising from moderate taxation, from tolls, national domains, and foreign subsidies. The cantons of Bern and Zurich, were considered as opulent; while in others, the resources hardly equalled the expenditure.

POLITICAL IMPORTANCE AND RELATIONS. The political importance and relations of Swisserland, are, for a time, immerged in those of the French republic. Should the Swiss emancipate their country, their chief object would be protection against the power of France; and, in this view, nothing could be so serviceable as a strict alliance with Austria*.

* By the constitution of the 29th May, 1801, Swisserland is divided into seventeen departments. The Pays de Vaud, and Argovie, are withdrawn from Bern; and the Grisons and Italian Bailliages, form two other departments. The other cantons remain as before, with some additions of ecclesiastic lands, &c. to Glarus, Appenzel, Friburg, and Basel. The abbatical territory of St. Gal, constituted the canton of Sentis by the division of 1798, which seems to be obliterated. The new constitution will probably be on the French model.

CHAPTER III.

CIVIL GEOGRAPHY.

MANNERS AND CUSTOMS.—LANGUAGE.—LITERATURE.—EDUCATION.—UNIVERSITIES.—CITIES AND TOWNS.—EDIFICES.—ROADS.—INLAND NAVIGATION.—MANUFACTURES AND COMMERCE.

MANNERS AND CUSTOMS. AMIDST the general corruption of manners, those of the Swiss have long excited applause, from their moral uniformity, and frank independence. The writings of Rousseau and other celebrated authors, have depicted the Swiss manners in almost every point of view, so that the theme has become trivial. Though moderate in diet, the Swiss are attached to wine, which produces gaiety and not irritation. The houses are generally constructed of wood, in the most simple form, with staircases on the outside; yet their appearance singularly coincides with the picturesque character of the country. The dress of the lower ranks is little subject to the laws of fashion, and in many cantons there are regulations to prevent idle ornament. Among the superior classes the manners may be considered as partly German, partly French; but it may be imagined, that at present, the latter preponderate. In general, the Swiss are remarkable for an intense attachment to their native country; and there are few who do not return there to terminate their existence. This impression is almost irresistable, and liable to be awakened by the most minute circumstances. Hence, in the French armies, the tune called the Rance des Vaches, often sung by the Swiss milk maids, when they went to the pastures, was carefully interdicted, because it melted the rough Swiss soldier into tears, and seldom failed to produce desertion. This unconquerable passion seems to arise in part from a moral sensibility to the enchanting ease and frankness of the native manners; and in part, from the picturesque features of the country, the verdant hills contrasted with Alpine snows, and delicious vales watered by transparent streams; scenes nowhere else to be discerned in such perfection, and which must powerfully affect the imagination, the parent of the passions.

LANGUAGE. The language of Swisserland, is a dialect of the German; but the French is much diffused, and is often employed by their best authors. In the most southern parts, bordering on Italy, the Valteline, and other territories acquired from Milan, the Italian is the common tongue. Among the Grisons in Engadina, and in some other parts, is spoken, what is called the Romansh, which seems

immediately derived from the Latin. The Valais, or that part of Swisserland watered by the Rhone, has also a particular dialect: and at the city of Sion, the French begins to be spoken, as it is also the prevalent language of that beautiful part of the canton of Bern, called the Pays de Vaud. The language called the Vaudois appears to have been confined to the valleys of Piedmont.

LITERATURE. Early monuments of Swiss literature, consisting as usual, of chronicles and lives of saints, may be found in the collection of Goldastus above mentioned. Since the restoration of letters and the reformation of religion, Swisserland boasts of many eminent names, as the reformer Ulric Zwingli, born at Wildhausen; De Watt, or Vadianus, a native of St. Gal; Bullinger; Herbst, who called himself Oporinus, the printer; Conrad Gesner, born at Zurich in 1516, who published an universal library, and some treatises on natural history; that noted quack Paracelsus, Turretin, and Osterwald. Among the writers of the last century may be named Bernoulli, the mathematician, a native of Basel; Scheuchzer, the natural historian; Haller, John Gesner, the natural philosopher; Solomon Gesner, the poet; Bonnet, Hirzel, and Zimmerman, physicians; Rousseau, and Necker, natives of Geneva; Lavater, the physiognomist; Euler the mathematician; Court de Gebelin, a learned but visionary writer, &c.

EDUCATION. The important subject of education has been little illustrated by the travellers into Swisserland; but as they testify their surprise at the knowledge generally prevalent among the peasantry, there is reason to infer, that this useful province is not neglected. There is an university of some reputation at Geneva, and another at Basel; with colleges at Bern, Zurich, and Lucerne.

CITIES AND TOWNS. In enumerating the chief cities and towns of Swisserland, according to the comparative standard of population, Basel will engaged the first attention, being supposed to contain 14,000 souls. This venerable city stands in a pleasant situation, upon the banks of the Rhine, here broad, deep, and rapid, and suddenly turning to its long northern course, after a previous western direction*. Basel crowns both banks, and is united by a bridge. In the middle ages this city was named Basula; and appears in history soon after the age of Charlemagne, having succeeded Augst, or the Augusta Rauracorum. The cathedral is an ancient Gothic edifice; and travellers have remarked a singularity, that all the clocks are one hour too fast, originally hastened, as is said, to defeat a conspiracy. The cathedral contains the tomb of the great Erasmus; and the university has produced many illustrious men.

BERN. Bern must claim the next rank to Basel, possessing a population of about 13,000†. This city is of singular neatness and beauty, the streets being broad and long; and the houses of grey stone resting on arcades. There are several streams and fountains; and the river Aar almost surrounds the city. The adjacent country is rich and fertile; and the prospect of hills, lawns, wood, and water, is bounded at a distance by the long chain of the superior Alps, rising

* Coxe, i. 149. † Ibid. ii. 226.

like snowy clouds above the horizon. Bern contains several libraries, and collections of natural curiosities.

ZURICH. Zurich is the third in rank among the Swiss cities, situated on a large lake, amidst a populous and fertile country, which produces abundance of wine for domestic consumption. The college, and plans of education are respectable; and the public library contains some curious manuscripts.

LAUSANNE. Lausanne contains about 9000 inhabitants, and is deservedly celebrated for the beauty of its situation, though in some spots deep and rugged. The church is a magnificent Gothic building, having been a cathedral, while the Pays du Vaud was subject to the house of Savoy.

The other chief towns are St. Gal, an ally of Swisserland under the former government. Mulhausen, also an ally. Geneva, a city of 25,000 inhabitants, has been assigned to France. Fribourg, and Schaffhausen contain each about 6,000 inhabitants; Lucerne, Solothurn, and Einsiedlen, about 5,000 each. Few of the others exceed 3,000.

EDIFICES. The chief edifices of Swisserland are in the cities; and there are few examples of magnificent dwellings erected by men of wealth or opulence. Inland navigation is partly interdicted by the mountainous nature of the country, partly rendered unnecessary by numerous rivers.

COMMERCE AND MANUFACTURES. Commerce and manufactures do not much flourish in this inland region. Cattle constitute the chief produce of the country; and some of the cheese forms an export of luxury. The chief linen manufactures were at St. Gal. Printed cottons, and watches, also form considerable articles of sale; nor are silk manufactures unknown in Swisserland.

CHAPTER IV.

NATURAL GEOGRAPHY.

CLIMATE AND SEASONS.—FACE OF THE COUNTRY.—SOIL AND AGRICULTURE.—RIVERS.—LAKES.—MOUNTAINS.—FORESTS.—BOTANY.—ZOOLOGY.—MINERALOGY.—MINERAL WATERS.—NATURAL CURIOSITIES.

CLIMATE AND SEASONS. THE climate of Swisserland is deservedly celebrated as salubrious and delightful. From its southern position, considerable heat might be expected; but this, though sufficient to mature the grape, is attempered by the cold gales from the Alps and glaciers. When the sun descends beyond mount Jura, on a summer evening, the Alpine summits long reflect the ruddy splendor, and the lakes, for near an hour, assume the appearance of burnished gold. The winter is, however, in some parts extremely severe; and the summer heat, in the deep vales, sometimes oppressive.

FACE OF THE COUNTRY. The face of the country is generally mountainous, the most level parts being the Thurgau, and a part of the cantons of Basel, Bern, Zurich, Schaffhausen, Soleure, and Fribourg. Even these present, what in some countries would be called mountains, from 2,000 to 2,500 feet above the level of the sea. No country in the world exceeds Swisserland in diversity of appearance; the vast chain of Alps, with enormous precipices, extensive regions of perpetual snow, and glaciers that resemble seas of ice, are contrasted by the vineyard, and cultivated field, the richly wooded brow, and the verdant and tranquil vale, with its happy cottages and crystal stream.

SOIL AND AGRICULTURE. Agriculture, of course, cannot be carried to great extent; but there is no defect of industry, and the grain seems sufficient for domestic consumption. Barley is cultivated even to the edge of the glaciers; oats in regions a little warmer; rye in those still more sheltered; and spelt in the warmest parts. Yet in general, the produce does not exceed five for one; and it has been necessary to support public granaries, in case of any deficiency. For the country, being principally destined by nature for pasturage, the chief dependence of the Swiss is upon his cattle, and the number being extraordinary, much land is laid out in winter forage, which might otherwise be productive of corn*. A considerable quantity of

* Busching xiv. 12.

lint and flax is also cultivated; and tobacco has been lately introduced. The best vines are those of the Pays de Vaud, the cantons of Bern, and Schaffhausen, the Valteline, and the Vallais. There is also abundance of fruits, apples, pears, plums, cherries, filberts; with mulberries, peaches, figs, pomegranates, lemons, and other products of a warmer climate, in those districts which border upon Italy. The Vallais also produces saffron.

But pasturage forms the chief province of the Swiss farm; and the meadows are often watered to increase the produce of hay. In the beginning of summer, the cattle are conducted to the accessible parts of the Alps, by cow-herds, who are called Sennen, in the language of the country, and who either account to the proprietor for the produce, or agree for a certain sum. Those herds also support many swine, with the butter-milk, and other refuse. Scheuchzer, in his first journey to the Alps, describes the numerous preparations of milk, which forms varied luxuries of the swains.

RIVERS. The rivers of Swisserland are numerous; and among the most sublime scenes of this country must be classed the sources of the Rhine and the Rhone, two of the most important streams in Europe. If we estimate their length of course through the Swiss dominions, the Rhine is the most considerable; and is followed by the Aar, the Reuss, the Limmat, the Rhone, and the Thur.

RHINE. The Rhine rises in the country of the Grisons, from a glacier upon the summit of mount Bedus, or Bader, at the head of a valley, about nine leagues in length, called the Rhinewald*. This mountain and valley are little visited, even by the Swiss; and the upper part presents dreadful deserts of ice and snow, through which the stream descends, sometimes visible, sometimes working a hidden track beneath frozen arches. Such is what is esteemed the chief source of the Rhine, being that styled by the French the Upper Rhine, and in German the Hinter, or nearer Rhine. The middle Rhine, which rises not far from mount St. Gothard, is indeed the longest stream, whence its source was formerly ascribed to that celebrated mountain; yet the most eastern is probably the more considerable. The celebrated Saussure†, than whom there cannot be a higher authority on these topics, informs us, that the further Rhine, which he supposes to be so called because it is nearest to Germany, arises from a chain of mountains at the head of the valley of Disentis, called Crispalt, while their highest point is styled Badur: that the middle Rhine proceeds from the valley of Medelo, an appendage of St. Gothard: and these two torrents united, receive a third from mount Avicula, called in French the Upper Rhine, and in German the Hinter Rhein, for in some French maps the names are inverted‡. The heights here are about 6180 feet above the sea. From its source the Rhine pervades or borders Swisserland, for about the space of 200 British miles, running north-east to the lake of Constance, whence it bends west to Basel; where it begins its long northern course.

* Coxe, iii. 243. Bourrit, Descript. des Glaciers, tome iii. p. 62.

† Voyage dans les Alpes, tome vii. p. 72. 8vo.

‡ Mr. Coxe, and Bourrit, have confounded the Upper and Lower Rhine. See Weisse's map.

AAR. The Aar arises in the Alp called Grimsel*, but there is a further source in the environs of that terrible summit, styled the Schreckhorn, and another from the glaciers of Finsteraar: bending its course to the north-west, till it arrive near Arberg, it afterwards turns north-east, receives the Reuss and the Limmat, and joins the Rhine opposite to Waldshut, after a course of about 150 British miles.

REUSS. The Reuss, which divides Swisserland into almost two equal parts, eastern and western, springs from the lake of Lucendrot, on the north-west of St. Gothard. This lake is long and narrow, the upper part being surrounded with black precipices, spotted with eternal snow; while the lower presents a little verdant plain. From the other side of St. Gothard rises the Italian stream of the Tesino, which flows into the Po not far below Pavia. The Reuss joins the Aar, after a course of about eighty British miles.

LIMMAT. The Limmat is composed of two streams, the Linth, which rises in the south of the canton of Glarus, and the Matt‡, which springs in the country of Sargans. About ten miles after their junction, the Limmat enters the lake of Zurich, whence it flows about twenty British miles before it joins the Aar. On the banks of the Limmat, commenced that dreadful conflict of the French against the Austrians and Russians, which extended down those of the Reuss, the line of battle being said to have reached for ninety miles; while, for fifteen successive days, the whole region seemed enveloped in fire and smoke||.

RHONE. The Rhone, a noble stream, can only be regarded as a Swiss river, prior to its entering the lake of Geneva, after a course of about ninety British miles through that extensive vale called the Vallais. This river rises in mount Furca, the source being rather warm, and about 5,400 feet above the sea. Yet in truth, this source joins a more considerable stream, from an extensive glacier called that of the Rhone, where the majestic river god resides in his palace of arches, formed under perpetual ice**.

THUR. The Thur, a moderate current, rises in the south of the country of Tokenberg, and pursues a north-west direction to the Rhine. Other considerable streams are the Sana, and the Emme, which join the Aar; the Inn, which commences his majestic progress in the Grisons, the Adda, which waters the Valteline, and falls into the lake of Como, and the Toss and Glatt, which join the Rhine.

LAKES. The lakes of Swisserland are numerous and interesting:

CONSTANCE. The most considerable are those of Constance, on the north-east, and Geneva in the south-west. The former is about forty-five British miles in breadth. This beautiful expanse of water is by the Germans also styled the Boden Zee. Towards the north-west it is divided into two parts, called the upper and lower lake, the latter of which contains the isle of Reichenau. Like all the other lakes of

* Coxe, i. 342. † Saussure, vii. 44.

‡ Weiss calls this river the Senez.

|| New Annual Register 1799, p. 447. This conflict spread in breadth from the Reuss to the Rhine. In Myttenthal, to the east of Schweitz, Suwarrof was defeated.

** Saussure, vi. 284, &c.

Swisserland, it is deeper in the summer than in the winter, owing to the melting of the snows, and is remarkable for producing large red trout.

GENEVA. The lake of Geneva extends in the form of a crescent, about forty British miles in length, and nine at its greatest breadth. The beauties of this lake have been celebrated by Rousseau; but would be considerably increased if it were sprinkled with islands.

Only a part of the lake Maggiore, or that of Locarno, is subject to Swisserland; but the lake of Lugano forms an extensive body of water in that region. The lakes of Neufchatel and Zurich, are each about twenty-five miles in length, by about four in breadth. That of Lucerne is about fifteen in length, and the breadth nowhere above three. Next to these are the lakes of Thun and Brientz; of Joux and Rouss, on the French confines; the lakes of Morat, and Bienne, of Sempach, Zug, Wallenstadt, and others of inferior note.

MOUNTAINS. The mountains of Swisserland are the most celebrated in Europe; and are supposed to yield in height to none, except those of South America, which derive their advantage from standing on an elevated plain.

ALPS. In a general point of view, the Alps extend, in a kind of semicircular form, from the gulf of Genoa through Swisserland, which contains their centre and highest parts; and close in the Carnic Alps on the north of the Adriatic sea. This grand chain of mountains has, in ancient and modern times, been divided into different portions, known by distinct appellations. The maritime Alps are those which arise from the gulf of Genoa. Mont Genevre, whence springs the river Durance, was anciently named the Alpis Cottia, from Cottius, a prince who resided at Suza. Further to the north, were the Alpes Graiæ, now the little St. Bernard. The Alpes Penninæ consisted of the great St. Bernard, mont Blanc, and the grand chain extending on the south of the Rhone, to the north of modern Piedmont; the eastern part being also styled the Lepontine Alps, from a people who inhabited that region, which gives origin to the Rhone and Tesino. The Rhætian Alps extended through the Grisons and Tyrol, terminating in the Carnic, or Julien Alps. That chain which pervades Swisserland, from mount Sanetz in the south-west, towards the sources of the Inn, on the north-east, was known by the appellation of the Helvetian Alps. Some writers admit of more minute divisions, as the Tridentine Alps above Trent; and the Noric Alps, about the source of the river Tajamento. The extent of this vast course of mountains may be computed at about 550 British miles.

The central part of this magnificent chain may be considered as divided into two ridges, running almost parallel from the south-west to the north-east. The first ridge is that of the Helvetian Alps, of which the most conspicuous summits are the Gemmi, or Geummi, the Schelenhorn, the Blumlis, the Geishorn, the Jungfrau, or Virgin horn, the Eiger, the tremendous Schreckhorn, or peak of terror, the Grimsel, the Furca; the extensive and somewhat devious ridges of mount St. Gothard, the Badur, and the glaciers, to the north of the further Rhine.

ST. GOTHARD. Of this chain, the St. Gothard has been long considered as one of the principal summits, because important rivers run

from its vicinity, in every direction: but this circumstance cannot be admitted to argue for its superior height, after the accurate observations of Saussure; and rivers often spring from an inconsiderable elevation, passing in the bottoms between high mountains. The celebrated naturalist of Geneva has chiefly confined his observations to the southern chain of the Alps; and the best account of the northern chain, appears to be that communicated by M. Wyttenbach to Mr. Coxe*. The Jungfrau seems the most elevated mountain of this chain; and to the west are the inaccessible peaks called Gletscherhorn, Ebenfluh, Mittaghorn, Grosshorn, Breithorn. Next in elevation seem to be the Eiger, and the Schreckhorn: yet some suppose that they yield to the Finsteraarhorn, which is only accessible from the Grimsel†. The summits consist of granite, generally, it is believed, the white; and the sides disclose red slate, and calcareous masses. In general, the granite appears in the south; and the calcareous superpositions on the north.

GUEMMI. The mountain of Guemmi, or the Twins, so called from its two summits, has been described by Bourrit. To the south are large deserts and glaciers; and on the north is the romantic lake of Kandel Steig, whence there is said to have been a passage to Lauterbrun, amidst singular glaciers, sometimes resembling magical towns of ice, with pilasters, pyramids, columns, and obelisks, reflecting to the sun the most brilliant hues of the finest gems. Yet according to the latter author‡, this chain is inferior to the southern in height; as mont Blanc seems one mass of ice, while in the northern chain the ice forms the smallest part.

The southern chain of the central Alps rather belongs to the north of Italy, than to Swisserland. It extends from mont Blanc and some eminences further to the west, and embraces the great St. Bernard, the Weiseh, mont Cervin, and mont Rosa. Passing to the north of the

* Swisserland, ii. 309.

† Saussure, vol. vii. p. 193, informs us that Mount Titlis, to the north of Mount Furca, is 10,818 feet above the sea; and that the Schreckhorn, and the Finsteraar, south of the Schreckhorn, are at least 2,400 feet higher. If so, these summits are about 13,218 feet, while Mont Blanc is 14,700 French feet: by the measurement of Sir George Shuckborough 15,662 feet English.

For this northern chain the reader may also consult Bourrit, vol. ii, p. 134, (who observes its course from M. Sanetz to St. Gothard), and the greater part of his third volume. St. Gothard is of great extent, with many summits, of which the highest is called Petina; and in the east begins a high ridge styled that of Adula, which is succeeded by the Crispalt, forming the southern boundary of the canton of Glarus (vol. iii. p. 62.). In his opinion, iii. 194, the Schreckhorn is the highest of the Swiss Alps. General Pfeffer, who made a noted model of the northern Alps, computes the height of St. Gothard above the sea at 9,075 feet, (Coxe, i. 320). Mr. Kirwan, Geo. Ess. 213, 217, says, that the Finsteraarhorn, Schreckhorn, Jungfrau, &c, are all of granular or primitive lime-stone; and supposes their height only to exceed 10,000 feet, quoting Helv. Mag. iv. 115, 116; but perhaps the skirts only were examined.

The doubts seem to be removed by the maps of Swisserland by Weiss, sheet 10, in which the heights are stated as follow, in French feet: Yungfrawhorn, 11,085; Monch, 10,879; Eiger, 10,481; Finsteraar, 11,447; Schreckhorn, 10,773; Wetterhorn, 9,966.

‡ Bourrit, iii. 59.

lakes of Locarno and Como, under the names of Vogelberg, St. Bernardine, Spluger, Albula, Bernini, &c. it stretches into Tyrol*, terminating in the Brunner, or Rhætian Alps on the south of the Inn, if it be not considered as extending even to Salzburg; while the first chain to the north of that river, divides Bavaria from Tyrol. This second chain has been ably illustrated by Saussure, who first visited the summit of mont Blanc, the greatest elevation on the ancient continent, being about 14,700 feet above the level of the sea. In his last journey, Saussure also visited mont Rosa, which only yields sixty feet in height to mont Blanc, being about midway between great St. Bernard, and the lake of Locarno, where our maps place a non-existence, called mont Moro, to the north of Macugnana, in the vale of Anzasca. Yet some entertain doubts whether the tremendous, and hitherto inaccessible, heights of the northern chain do not exceed those measured by Saussure; and they certainly present sufficient objects for the ambition of future travellers.

It was reserved for this age of enterprize to disclose the secret wonders of the superior Alps. The enormous ridges, clothed with a depth of perpetual snow, often crowned with sharp obelisks of granite, styled by the Swiss, horns or needles; the dreadful chasms of some thousand feet in perpendicular height, over which the dauntless traveller sometimes stands on a shelf of frozen snow; the glaciers, or seas of ice, sometimes extending thirty or forty miles in length; the sacred silence of the scenes before unvisited, except by the chamois and goat of the rocks; the clouds, and sometimes the thunder-storm, passing at a great distance below; the extensive prospects, which reduce kingdoms, as it were, to a map; the pure elasticity of the air, exciting a kind of incorporeal sensation; are all novelties in the history of human adventure.

Constitution. With regard to the constitution of these grand chains, we learn from Saussure†, that the highest summits consist of a large grained granite; the mixture being white opake felspar, greyish, or white semi-transparent quartz, and mica in small brilliant scales, thus forming what is called the white granite. The colours sometimes vary; and sometimes hornblende, schorl, garnets, or pyrites, are interspersed. The construction seems to consist of flat pyramids of granite, standing vertically, disposed like the fruit of the artichoke; those of the centre being most upright, while the others bend towards them. These flat pyramids commonly stand, like the grand chains of the Alps, in a north-east and south-west direction. Beneath, and incumbent on the granite, especially towards the north, appear large masses of slate; which are followed by exterior chains of high calcareous mountains. The reader, who is desirous of more minute details, concerning those magnificent features of nature, may consult the works of Saussure, and other celebrated naturalists, who have written professedly on this interesting topic.

* The highest mountains in Tyrol are said to be the Plaley Kogel, 9,748 Parisian feet above the sea: the Glockner 11,500, the Ortele 12,000. See an estimate of the heights of the mountains in Italy and Germany, (rather in Salzburg chiefly,) Monthly Magazine, vol. ix. p. 539.

† Tome ii. 334.

Forests. Of forests, there does not appear to be any semblance in Swisserland; and such is the scarcity of wood, and even of turf, that the dung of cows and sheep is often used for culinary fire.

Botany. Swisserland, from its southern climature, and its elevated situation, may be considered with regard to its botany, as an epitome of all Europe. From its low sunny vallies, that open upon the Italian frontier, to the higher Alps, covered with glaciers and eternal snow, the traveller may experience in succession, the climates of Lapland, Germany, France, and Italy. Of maritime plants, on account of its inland situation, it possesses none; and many of those which adorn, and perfume the arid tracts of heath in Spain and Portugal, are equally wanting. The swamps of Holland, also, possess many that are strangers to Swisserland; but those species that delight in the pure invigorating air of the mountains, that drink life and fragrance from the dashing torrent, that bend over the margin of the transparent lake, and luxuriate in the sheltered recesses of the overhanging rock, flourish here in a profusion and glow of beauty, that cannot be conceived by the inhabitant of Lowland countries.

The spiry pinnacles of rock that rear themselves from among the perpetual snows, that overspread the summits of the higher Alps, are almost wholly destitute of vegetation; a few of the crustaceous lichens, and here and there a tuft of Silene acaulis, and saxifraga nivalis, and stellaris, comprise the whole of their scanty flora.

From the very edge of the snow commences a zone of rocky pasturage, the native domain of the bounding chamois, but encroached upon for a few weeks in the height of summer by the sheep; covered with a short barren turf, except where the rills, trickling through, give birth to a more luxuriant vegetation: the effect of the cold is here strikingly displayed, not merely in the plants being all of them truly alpine, but from their being shrunk and condensed into such minute specimens, as to require a close inspection to be aware of their vast variety: artia alpina and villosa, soldanella alpina, astrantia alpina, cherleria sedoides alchemilla pentaphyllea, chrysanthemum atratum, and gentiana nivalis, are some of the principal.

Still further from the summits the pasturage becomes more abundant, and accessible to the cattle for about forty days at Midsummer: a few of the hardier shrubs begin to make their appearance, and the turf here assumes that truly enamelled appearance, that is so characteristic of Swisserland: the more exposed situations offer to the botanist scutellaria alpina, gentiana acaulis, globularia nudicaulis, pedicularis verticillata, bartsia alpina, saxifraga cæsia, and rosa alpina, all of them plants of exquisite beauty; astrantia major, and saxifraga rotundifolia, of less ostentatious charms, and carex filiformis, with phleum alpinum, and other viviparous grasses. In the alpine vallies, and along the course of the torrents, vegetation assumes a more stately appearance; the juniper, the savine, the stone pine, and alder, broken by nature into irregular thickets, diversify the scene: their edges are bordered with cacalia alpina, aquilegia alpina, ranunculus aconitifolius, and pyrola minor; the cascades are overhung with bowers of rosa alpina, mespilus chamæmespilus, salix retusa, and reticulata; in the clefts of the rocks are tufts of saxifrages, auricula, and the rare saponaria lutea: and the spungy

hillocks, are eminently resplendent with rhododendron ferrugineum, azalea procumbens, pinguicula alpina, and saxifraga aizoides.

Below all these, on the declivities of the mountains, commence the forests of larch, of pine, and fir, intermixed here and there with the yew, the mountain ash, and the birch; under their shade are found pyrola uniflora, melampyrum sylvaticum, and nemorosum, viola biflora, tussilago alpina, linnæa borealis, and other natives of the Scandinavian forests.

Among these upper woodlands are the richest meadows of Swisserland, luxuriant with grass and clover, and ornamented with the yellow gentian, the white hellebore, actæa spicata, anemone alpina, and pulsatilla, and innumerable other mountain plants.

Where the fir-woods cease, the sub-alpine regions begin, diversified with meadows and corn fields, and forests of deciduous trees. The oak, the elm, the beech, the ash, the lime, and the hornbeam, are the most prevalent, and the borders of the streams are shaded by poplars, and willows. The plants are chiefly those which occur in the north and midland parts of France and Germany. The *dog's-tooth violet*, erythronium dens canis; digitalis lutea, and dubia, fumaria bulbosa, asclepias vincetoxicum, cerinthe major, cyclamen europæum, saxifraga hirculus, and pyramidalis: the dry stony places are occupied by arbutus uva ursi, vaccinium vitis idæa, cratægus cotoneaster; in the woods are found daphne gnidium, aconitum napellus, several species of helleborus, and convallaria: and the pastures, and hedge sides, yield the orange and martagon lilies; the branched asphodel, the iris germanica, clustered hyacinth, narcissus, and daffodil, with an innumerable multitude of orchideæ.

The lowest and warmest situations in Swisserland are the plains and broad valleys of Geneva, of Basel, of the Pays de Vaud, of the Valteline, and La Vallais; in these we meet with numerous vineyards, and the trees and plants of the south of France, and Italy. The walnut, the chesnut, the fig, the pomegranate, the bay, and laurel, cornus mascula, *Cornelian cherry;* celtis australis, and mespilus amelanchier are the most characteristic among the trees; the *lavender*, lavandula spica; origanum creticum, *cretan origany;* hyssopus officinalis, *hyssop;* atropa mandragora; dictamnus albus, *fraxinella;* ruta graveolens, *rue;* several kinds of cistus, sida abutilon, and peonia officinalis, *peony*, are some of the chief of the herbaceous plants and lower shrubs. The valleys that open towards Italy contain, besides, a few plants that are not found in the rest of Swisserland; such as the *lilac*, syringa vulgaris; capparis spinosa, the *caper-bush;* amygdalus communis, the *almond*, among the fissures of the rocks; cactus opuntia, *Indian fig;* and agave Americana, *American aloe.*

Zoology. The horses of Swisserland are esteemed for vigour and spirit; and the cattle often attain great size.

Ibex. Among the animals peculiar to the Alps may first be named the Ibex, bouquetin, or goat of the rocks; of which a good account, with an engraving, is given by Mr. Coxe*. This animal resembles the common goat; but the horns are extremely long and

* Coxe, ii. 53, &c.

thick, and of such strength as to save them in headlong descents from the precipices. It is more common on the Italian than on the Swiss Alps. The hair is long, and ash coloured, with a black list along the back. The female is one third less than the male; and her horns are small, while those of the male are about two feet six inches in length. The bouquetin will mount a perpendicular rock of fifteen feet, at three springs, bounding like an elastic body struck against a hard substance. In the day he seeks the highest summits, but in the night, the nearest woods, browsing on aromatic plants and dwarf birch, and in the winter on lichens. His common cry is a sharp short whistle. The chace is vashly dangerous, and exposed to many accidents.

CHAMOIS. Another singular animal is the chamois, which belongs to the genus of antelope; and is commonly seen in herds of twenty or thirty, with a centinel who alarms them by a shrill cry*. The colour is yellowish brown, but they sometimes occur speckled. The food is the lichen, with shoots of pine or fir. The marmot is common in the Swiss mountains. In summer they feed on Alpine plants, and live in societies, digging dwellings in the ground for summer, and others for winter. About the beginning of October, having provided hay, they retreat to their halls, where they remain torpid till the spring. The skin of this little animal is used for furs. The marmot may be tamed, and shews considerable docility. The size is between that of the rabbit and the hare.

Among Alpine birds may be named the vulture, called also the golden or bearded vulture. The head and neck being covered with feathers, it might be classed with the eagles, were it not for the form of the body, and shape of the beak. It inhabits the highest Alps, forming its nest in inaccessible rocks, and preying on the chamois, white hare, marmot, and sometimes on kids and lambs. Among Alpine birds may also be named the red legged crow, and turdus cæruleus. The lakes of Swisserland have few peculiar fish.

MINERALOGY. The mineralogy of this interesting country is not so important as we might be led to infer from its mountainous nature. Some of the streams wash down particles of gold, as the Rhine, the Emmat, the Aar, the Reuss, the Adda, and the Goldbach†. Mines of silver are mentioned; but the places are not specified. Copper and lead are also found: but the chief mines are those of iron in the country of Sargans. In the canton of Bern there are valuable quarries of rock salt‡; and it is said, that coal and native sulphur are not unknown. But the grand stores of minerals are in Piedmont, and the southern sides of the Alps; as in Hungary, they are in the south of the Carpathian mountains; and the richest minerals are also found in the south of the Pyrenees. In ridges running north and south, it is believed the eastern side is generally the most productive. Rock crystal forms perhaps the chief export of Swisserland, being sometimes found in such large pieces as to weigh seven or eight hundred weight. The calcareous part of the Alps often presents beautiful marbles, and good

* Coxe, i. 343. † Busching, xiv, 11.

‡ Keysler, i. 146, says that the salt works are at Bevieux, Roche, and Panex, in the Pays de Vaud.

slates are not uncommon. As to granite and porphyry, the country may be said to consist of them. Among the Alps are also found serpentines, steatites, asbestos, amianthus; with jaspers, agates, and various petrifactions. Near Chiavana is a grey quarry of lapis ollaris, which has been long wrought into pots of various dimensions, and which will stand the fiercest fire. Among the mineralogic curiosities may be named the adularia, or glassy felspar, on the mountains of Adula already mentioned; and the tremolite, so called from Mont Tremola near St. Gothard.

MINERAL WATERS. Of mineral waters the most remarkable are those of Leuk. Scheuchzer, in his third journey, describes the singular warm baths of Fabara, or Pfeffers, in the country of Sargans, to which the visitants passed through a long narrow chasm, by a passage extremely dangerous. To the south-east are the baths of Alvenew, which are sulphurous, and resemble Harrowgate water*. As such baths commonly belong to calcareous countries, it is believed that Swisserland cannot boast of many.

NATURAL CURIOSITIES. To enumerate the natural curiosities of Swisserland, would be to describe the country. The Alps, the glaciers, the vast precipices, the descending torrents, the sources of the rivers, the beautiful lakes and cataracts, are all natural curiosities of the greatest singularity, and most sublime description. Of late, the glaciers have attracted particular attention; but those seas of ice, intersected with numerous deep fissures, owing to sudden cracks which resound like thunder, must yield in sublimity to the stupendous summits clothed with ice and snow, the latter often descending in what are called avalanches, or prodigious balls, which, gathering as they roll, sometimes, overwhelm travellers, and even villages. Nay, the mountains themselves will sometimes burst and overwhelm whole towns, as happened in the memorable instance of Pleurs, near Chiavana, in which thousands perished, and not a vestige of a building was left: nor are recent instances, though less tremendous, wholly unknown. The vast reservoirs of ice and snow, give birth to many important rivers, whose sources deeply interest curiosity. As an example, the account which Bourrit gives of that of the Rhone may be selected. "At length, we perceived through the trees, a mountain of ice as splendid as the sun, and flashing a similar light on the environs. This first aspect of the glacier of the Rhone, inspired us with great expectation. A moment afterwards, this enormous mass of ice having disappeared behind thick pines, it soon after met our sight between two vast blocks of rock, which formed a kind of portico. Surprised at the magnificence of this spectacle, and at its admirable contrasts, we beheld it with rapture. At length we reached this beautiful portico, beyond which we were to discover all the glacier. We arrived: at this sight, one would suppose one's self in another world, so much is the imagination impressed with the nature and immensity of the objects. To form an idea of this superb spectacle, figure in your mind a scaffolding of transparent ice, filling a space of two miles, rising to the clouds, and darting flashes of light like the sun. Nor were the several parts less

* In England.

magnificent and surprising. One might see as it were, the streets and buildings of a city, erected in the form of an amphitheatre, and embellished with pieces of water, cascades, and torrents. The effects were as prodigious as the immensity and the height; the most beautiful azure, the most splendent white, the regular appearance of a thousand pyramids of ice, are more easy to be imagined than described. Such is the aspect of the glacier of the Rhone, reared by nature on a plan which she alone can execute: we admire the majestic course of a river, without suspecting that what gives it birth and maintains its waters, may be still more majestic and magnificent." He afterwards describes the river as issuing from a vault of ice, as transparent as crystal; and illuminated by streams of sunshine darting through apertures in the roof.

In the Vallais, above Siders, the banks of this river are singularly studded with conical hills, sometimes crowned with wood, sometimes with ancient castles. On the north of Swisserland, the Rhine, near the village of Neuhausen, descends in a cataract of forty feet, amidst black and horrid rocks. Among the milder charms of Swisserland may be named the lakes, and the small lake of Kandel Steig bears at one extremity the charms of summer, while the other presents the glaciers and pomp of winter. Numerous rills, which descend from the mountains often fall in cascades of great beauty, among which that of Staubbach is computed at 900 feet, over a rock as perpendicular as a wall*. The verdant vales, sometimes bordered with perpetual ice, also delight the traveller; who may be inclined, in these corrupt times, to consider as a natural curiosity, the frank and simple manners of the inhabitants.

* Bourrit, iii. 163.

GERMAN STATES.

CHAPTER I.

GENERAL DESCRIPTION OF GERMANY.

EXTENT.—BOUNDARIES.—ORIGINAL POPULATION.—PROGRESSIVE GEOGRAPHY.—HISTORICAL EPOCHS.—ANTIQUITIES.—RELIGION.—POPULATION.—ARMY.—NAVY.—LANGUAGE.—LITERATURE.—ROADS.—FACE OF THE COUNTRY.—RIVERS.—LAKES.—MOUNTAINS.—FORESTS.—BOTANY.—ZOOLOGY.—MINERALOGY.—MINERAL WATERS.—NATURAL CURIOSITIES.

IN describing an extensive country, subdivided into many states, it becomes indispensable to give a general idea of the whole, before the respective territories are delineated. The geography of Germany is the most perplexed of any region on the globe, the great divisions, or *circles*, being now interwoven, and almost antiquated, while no modern and more rational distribution has yet appeared. This observation even extends to the inferior states, many of which are *enclavées*, or mortised in each other.

EXTENT. Germany, considered in its modern limits, extends about 600 British miles in length, from the isle of Rugen in the north, to the southern limits of the circle of Austria. The modern breadth, from the Rhine to the eastern boundary of Silesia, is about 500 British miles: anciently the breadth extended beyond the Vistula, about 200 miles more to the east, a space since filled by the Poles, a Slavonic nation.

ORIGINAL POPULATION. This country appears to have been full of extensive forests, even in the Roman period; and of course to have been in many parts thinly peopled, yet there are faint indications that the Cimbri, or modern Celts, possessed several tracts in the south,

as they certainly held a large portion of the north-west. On the north-east of Germany, the Finnish nations are well known to have preceded the incursions of the Goths and Slavons. The Scythians or Goths, proceeding from their original seats on the Euxine, expelled the Cimbri and Fins; and long before the light of history arises, had planted colonies in the north of France, whence a part had passed to England, not to mention their southern possessions in Gaul and Spain. The Goths on the Euxine, and the German nations, were the destroyers of the Roman empire in the west; and it is in vain with the weak authors of a fabulous age, to trace their origin to Scandinavia, which, in the classical period, had only detached two colonies, the Jutes or Danes, and the Picts of Scotland.

Progressive Geography. The progressive geography of Germany, though an interesting topic, has never been ably illustrated; and the ancient is obscure, for even D'Anville has been contented to follow the antiquated errors of Cluverius and Cellarius, men of plodding erudition, but destitute of judgment and sagacity, and who have composed maps, which have little relation with the grand and immoveable features of nature. It appears that the central parts of Germany were little known to the ancients. The southern and western districts, as bordering on the Roman empire, had been partially explored. Roman ships had navigated the Baltic, and Roman armies had visited the northern course of the Elbe; but the centre and the east, though filled by Ptolemy with many names, must be regarded as nearly unknown, since he errs so widely in the arrangement of mountains and rivers. It would appear that the Roman arms had penetrated nearly in a direction due east, to the nearest circuit of the Elbe near Magdeburg, in which quarter the trophies of Drusus were erected. On the south, the Sudetic mountains, and perhaps the Erzgeberg, seem to bound the knowledge of the ancients; while through the centre of Germany, from the Rhine to the Vistula, extended the vast Hercinian forest, by Hessia, Thuringia, and the north of the Sudetic and Carpathian mountains. The mountain Melebocus of Ptolemy seems to be the same with the Bructerus of others, representing the most northern mountains of Germany, those of the Hartz; and the Semana Sylva may also be sought near the course of the Roman army towards Magdeburg. There is reason to believe, that Ptolemy, borrowing from various writers, often gives the same nation or tribe, under different names, and thus peoples spaces, which would otherwise present a wide blank; so that the most authentic sources of German geography, are the writings of Pliny, Tacitus, and other historians.

The interior of this country remained unexplored till the age of Charlemagne, and the northern parts for some centuries after that period. Longer details would not be adapted to the limits of this work; but it appeared essential to indicate some radical errors in the classical geography of a country, whence most of the modern European nations have proceeded.

Historical Epochs. Some of the grand historical epochs have already been mentioned, in describing those large portions of Germany, the Austrian and Prussian dominions; and some of the others may be briefly hinted, in the account of the respective states.

Suffice it here to mention: 1. The ancient period, chiefly resting on the account of the Roman and Francic historians. 2. The middle period. In the end of the eighth century, Charlemagne having subdued a great part of Germany* and Italy, was in the year 800, proclaimed Emperor of the West. His successor, Louis le Debonnaire held the empire with France; but his son Lothaire I, was restricted to Germany. After many intestine commotions, Henry, duke of Saxony was chosen emperor in 918; the line of Charlemagne having failed six years before. He was followed by his son Otho the Great, 936: and the line of Saxony failing 1024, was followed by that of Franconia. In the twelfth century arose the factions of the Guelphs, and Gibelines, the latter being the partisans of the emperor. Frederic Barbarossa, who ascended the Imperial throne 1152, is a distinguished name. Long contests having again arisen, the sceptre was at length assigned to the house of Austria in 1273: and after some deviations continued to remain in that family. 3. The modern period, which may be traced from Charles V; or from his grandfather Maximilian.

ANTIQUITIES. The antiquities of Germany chiefly consist of a few Roman remains in the south and west. It would be endless to enumerate the churches founded by Charlemagne; or the numerous castles created by powerful princes and barons.

RELIGION. The religion of the greater part of Germany may be pronounced to be the reformed, first introduced into Saxony by Luther. Yet the south continues firmly attached to the Roman Catholic faith, now chiefly supported by the house of Austria. The government is that of an aristocracy, which elects a monarch, who may be of any family, Catholic, Lutheran, or Calvinist. To consider the constitution at length, which has been called by a German writer "a confusion supported by Providence," would be foreign to the nature of this work; and indeed little interesting, as being an antiquated and inefficacious system, expected speedily to sink under the power of Prussia and Austria. The work of Putter may be consulted by those who have patience to investigate such subjects.

POPULATION. The population of Germany in general is computed at little more than 25,000,000.

ARMY. It was supposed that the empire could, if united, send forth a contingent army of 400,000; but such calculations are visionary in the present state of affairs. The revenues, political importance and relations, are now detached, and have already been in a great part considered under the articles of Prussia and Austria. The manners, customs, and dialects, vary according to the different states.

LANGUAGE. The Saxon is accounted the purest and most classical idiom of the German tongue; and the southern dialects of Suabia, Bavaria, and Austria, the most uncouth.

LITERATURE. The literature will best be considered under each state; to style an author a German, being almost as vague as to call him an European, so distinct are the several states and the shades of civilization.

* Particularly the Saxons: the southern parts had before been subject to the Franks, and were converted to Christianity.

ROADS. The roads in general are bad; and the postillions noted for insolence and indolence. Most of the other topics can be illustrated with more precision in the account of such states as deserve particular attention.

It will be remembered that in the descriptions of the Austrian and Prussian dominions, are contained many of the eastern provinces of Germany. The part which remains is the western half naturally divided into two portions by the river Mayn. The remaining objects to be generally considered in this western portion are chiefly the aspect of the country, the rivers, lakes, mountains, and forests, with the botany and zoology: other topics being more appropriated to each state.

FACE OF THE COUNTRY. To the north of the Mayn Germany chiefly presents wide sandy plains, which seem as if they had been, in the first ages of the world, overwhelmed by the sea. A few hills begin to appear in the neighbourhood of Minden; and in the south of the Hanoverian dominions arise the most northern mountains of Germany, those of Blocksberg, and others in the Hartz. To the south-west are the mountains of Hessia, and others, extending towards the Rhine: while on the east, the rich and variegated country of Saxony, one of the most beautiful and fertile in the empire, extends to the southern limits of the mountains of Erzgeberg, abundant in mines and singular fossils.

The regions to the south of the Mayn may be regarded as rather mountainous, while our maps represent Germany as one continued plain.

RIVERS. Both portions are watered by numerous and important rivers.

ELBE. In the north the Elbe is the most distinguished stream, rising in the Sudetic mountains of Silesia; and, after running south for about fifty miles, it suddenly assumes its destination of north-west, receives the Bohemian Mulda and Eger, the Mulda and Sala of Saxony, and the large river Havel from the east, and enters the sea near Cuxhaven, after a comparative course of more than 500 British miles. The chief cities on the banks of the Elbe are Dresden, Meissen, Wittenberg, Magdeburg, from which it runs almost a solitary stream to Hamburg. The tide is perceived to the height of twenty-two miles; and, when raised by a north wind, middle sized vessels may arrive at Hamburgh, but they are in general, obliged to anchor a mile below the city*.

Not far to the west is the mouth of the Weser, which first receives that name when its two sources, the Werra and the Fulda, join near Munden in the principality of Calenburg, about sixteen British miles south-west of Gottingen.

WERRA. The Werra springs in the principality of Hildburghausen; and the Fulda in the territories of the bishoprick so called; the former having the longest course, and being justly considered as the chief source of the Weser, which thus flows about 270 British

* Busching, vi. 16. But he forgets to inform us how far the Elbe is navigable by boats or barges.

miles. The principal towns on this river are Bevern, Minden, and Bremen; the Rhine alone boasting of numerous cities on its banks. The chief tributary stream is the Aller from the duchy of Brunswick. The inundations of the Weser are terrible, the adjacent towns and villages seeming to form islands in the sea: hence the shores are esteemed unhealthy.

The Ems is an unimportant river, which arises in the bishoprick of Munster.

Rhine. The sources and mouths of the Rhine have been already described. This noble river forms the grand ancient barrier between France and Germany; and its course may be computed at about 600 British miles. On the German side it is diversified with mountains and rocks: but from Basel to Spire the shores are flat and uninteresting*. Near Mentz, they become rich, variegated, and grand; and on the confluence with the Mayn the waters are distinguishable for many leagues. The Rhinegau is not only celebrated for its wines, but for the romantic appearance of the country, the river running through wild rocks crowned with majestic castles. Hence as far as Bonn, the shores abound with beautiful and striking objects, the Rhine not seeming to assume his grandeur, till after his junction with the Mayn†.

Danube. In the southern part of Germany the most important river is the Danube, which, according to the common opinion rises near the little town of Doneschingen in Suabia, and Count Marsigli has engraved the springs; but some place the sources a little further to the north‡. This noble river becomes navigable a little above Ulm, where it receives the Iler. The next tributary stream of consequence is the Lech, which comes from Tyrol, a stream distinguished in the seat of the recent war; as is the Iser, proceeding from Upper Bavaria. The Danube runs about 250 miles through this part of Germany, passing by Ulm, Ratisbon, and Passau. To Orsova it may be considered as an Austrian river, for about 550 miles; thence it is Turkish for 480 to the Euxine.

Necker. The Necker is a tributary stream of the Rhine, rising in the Black Forest, not far from the Danube, and running a picturesque course of about 150 British miles, through a country variegated with vineyards. Another and grander tributary stream of the Rhine, springs from the lake of Fichtel See, on the mountain of Fichtelberg, esteemed among the most elevated parts of Germany, as it gives source to four rivers running in various directions, the Mayn to the west, the Eger to the east, the Sala to the north, and the Nab to the south. This source is called the White Mayn; while another source, the Red Mayn; so called from the red clay through which it flows, rises near Hærnleinsreuth, in the principality of Bareuth.

* Gardnor's Views on the Rhine.

† Ibid. Riesbeck, iii. 261. observes, that the hills extend to near Cologne: but lower than those to the south of Mentz. At Cologne end the dominions of the German Bacchus.

‡ The Brege is in fact the longer current, yet it is said to fall into the Danube.

MAYN. The Mayn, after receiving the Rednitz and other considerable streams, joins the Rhine to the south of Mentz. The Mayn is a muddy stream, but abounds with trout, carp, and other fish. After pervading the rich bishopricks of Bamberg and Wurtzburg, and some territories of the see of Mentz, it waters the walls of Frankfort, formerly a city of celebrated trade; and has recently acquired fresh importance from being considered by German politicians as a natural boundary between the power of Prussia in the north of Germany, and that of Austria in the south.

LAKES. To the north of the Mayn Germany presents few lakes, the largest being in the duchy of Mecklenburg, where the lake of Plau extends under various names about twenty-five British miles in length by six in breadth: that of Schwerin is about eighteen miles in length, while that of Ratzburg is fifteen. Next is one in the county of Diepholtz, and another in the county of Mansfeldt in Upper Saxony. In the more southern and Alpine regions, the Boden See, or lake of Constance, is the most distinguished expanse of water, already described under Swisserland.

CHIEM SEE. Next is the Chiem See in Upper Bavaria, about fourteen British miles in length, by five in breadth, sometimes largely styled the sea of Bavaria. That circle, like most mountainous countries, also contains many other lakes of smaller account.

MOUNTAINS. The most northern mountains in Germany are those of the Hartz, called the Brocken or Blocksberg*. These mountains rise in the form of an amphitheatre, the highest being what is called the Great Blocksberg; which, (while the others are covered with pines and birch, thus uniting the ancient confusion of forest and mountain,) only presents white stinted brushwood: and the snow sometimes remains till midsummer, and even longer in the northern cavities. On the summit is a small hovel, a retreat for those who ascend. The river Ilse rises from the bottom; and other streams spring from the hills to the north-west and to the east, which afford many medical herbs. The height of the Great Brocken is by the barometer 3021 feet; and the Little Brocken 2713.

In Westphalia there are some hills near Minden†: and in the duchy of the same name, bordering on Hessia, are the mountains of Winterberg, Astenberg, Schlossberg, and others‡. The Hessian territories may be regarded as generally mountainous, especially towards the north. The range of Meisner contains a coal mine, under which is a bed of petrified wood||. To the north of Cassel are many high mountains, as the Stauffenberg, the summit of which is called Bartlespopf, and the Gameberg towards Munden. In the Hessian territories are also the *bergs* of Doern, Behren, Schrecklen, Guden, Valken, all in the district of Zieremberg, with many in the south-east of Felsberg; not to mention the hilly forest of Habichtswald. Thence south-west

* Busching, x. 251.

† Riesbeck, iii. 117, says, that he did not observe one hill from Hamburgh to Embden, nor from thence to Hanover; and in Westphalia the heaths are more barren than those of Jutland.

‡ Ibid. viii. 8-9. *Berg* in German signifies a mountain; and is rather a superfluous addition.

|| Ibid. 252.

towards the Rhine are several considerable rivers, among which may be mentioned those in the west of Wetterau, and the seven hills near the Rhine almost opposite to Andernach; with the ridge of Heyrich which protects the vines of Rhinegau. To the east of Frankfort on the Mayn is the hilly forest of Spessart, with the metallic heights of Fulda and Henneberg; and that river springs from the remarkable mountain of Fichtelberg, or the mountain of pines, near twenty-two British geographical miles in length, and sixteen in breadth, diversified with deserts, precipices, high rocks, and marshes*. The summits have various names, the Ochsenkopf being reputed the highest. The lake called Fichtel See is in a cavity of this mountain, called the See Loh†; but is of little extent, being only remarkable as the source of the White Mayn. Other parts of this memorable mountain give rise to the Eger, which runs to the east, and the Sala and Nab flowing to the north and south.

Erzgeberg. But the most celebrated mountains in that part of Germany which lies to the north of the Mayn, are the Erzgeberg, or Metallic Mountains, which rise to the north-east of the Fichtelberg, running between Bohemia and Saxony, but supplying both countries with silver, tin, and other metals. The Erzgeberg are not of remarkable height, yet contain much granite like those of the Hartz and Hessia; with gneiss, which is found in most of the Saxon and Bohemian mines. Granular lime-stone also appears; and in Upper Lusatia an entire mountain is found of siliceous schistus, while Flinzberg consists almost entirely of milk-white quartz‡. Misnia contains mountains of pitch-stone; and that strong primeval substance called hornblende, which approaches to the nature of iron, is found in mighty strata. In Voigtland, near Averbach, appears the famous topaz rock, consisting of pale topazes in hard lithomarga. Micaceous schistus and slate also form portions of the Saxon mountains; with large masses of trap and basalt, often imbedded in the gneiss, which likewise contains strata of serpentine. Hornblende, slate, and sand-stone, both calcareous and siliceous, also contribute to this noted chain. Those of Hessia present nearly the same opulence of primary and secondary substances: and a summit of the Meisner, as already mentioned, consists of basalt resting on coal. In the Hartz, granite also abounds; with porphyry, slate, and other primitive substances‖. The metals will be considered in the account of each country.

* Ib. ix. 171. Reckoning the German geographical mile of fifteen to the degree, as equal to four British. The French translator of Busching has been very careless in rendering the miles. Riesbeck, iii. 165, describes the Spessart; and p. 199 the view from Alkoniger (about ten miles north of Frankfort) extending about fifty miles in every direction.

† The German *Lob* or *Loch*, a cavity, is the parent of the Scottish Loch, a lake.

‡ Kirwan. Geol. Ess. 174. 176.

‖ At Pohlberg in Saxony basaltic columns rest on gneiss; and those of Stolpe, in the same country, rise without articulation to the amazing height of 300 feet. Kirwan. Geo. Ess. 248-250. In the valley of Plauen are several coal mines; and there is also coal at Halverstadt, a country far to the north-west. Ib. 302-308.

BERGSTRASS. Among the German mountains to the south of the Mayn may first be named the Bergstrass, a ridge passing from near Manheim to the vicinity of Frankfort, and accompanied by a high-way, commanding prospects of wide extent. On the east are the high hills of Odenwald*.

WURTEMBURG. Further to the south are the mountains of Wurtemburg, rising both on the east and west of that extensive duchy. On the west the mountains form a continuation of those of the Black Forest, which hence proceeds south to the Rhine, being the mount Abnoba of Tacitus, whence he justly derives the source of the Danube; and the Helvetian forest of Ptolemy.

BLACK FOREST. The mountains of the Black Forest, in German Schwarzwald, extend from near Neuenburg, in the territories of Wurtenburg, south to the four forest towns on the Rhine†. The southern part is called the High, and the northern the Lower forest: the length being about eighty British miles. To the east the Necker may be considered as a boundary; and the breadth may be computed at about twenty British miles. The eastern part, as usual, presents a gradual elevation; while the western shows precipitous summits to the inhabitants of Baden and Alsace. The appellation seems to arise from the thick dark forests with which the ascents are clothed. Besides pasturage, the inhabitants (partly ruled by Austria, partly by Wurtemburg,) derive advantage from the rosin of the pines, and the timber, of which they make all kinds of utensils. Some parts are cultivated by spreading branches of pine, covered with sod, which being burnt, an excellent manure prepares the ground for four abundant harvests. A branch of the Black Mountains spreads east from near Sulz on the Necker, towards the county of Oetingen, being more than sixty miles in length.

ALB. This chain is called the Alb, and sometimes the Suabian Alps. Busching traces this ridge from the north-east extremity, the source of the Brenz to the west of the Neresheim, by Wisensteig, where the mountains are highest. Thence they turn north-west to Guttenberg, and west to Neiffen, whence they pass by Hohenzollern to the Necker, then bend south and west between that river and the Danube. Busching adds that as this chain rises insensibly at Konigsbronn north-east, so it gradually terminates at Ebingen south-west. The principal summits are in the north and west of the ridge; and the forests are chiefly beech, while the open spaces supply pasturage for numerous flocks of sheep.

Of these two extensive ridges of mountains, the Black Forest, and the Alb, a considerable portion pervades the duchy of Wurtemburg; and near Stutgard, the capital, are the mountains of Boysersteig, Weinsteig, and Hasensteig. The constituent parts of these extensive ridges have been little detailed; but a great part is calcareous, as they

* See the above picturesque passage of Riesbeck, who says, that from the Aikoniger he saw, with the rising sun, the summits of Odenwald and Spessart, appearing at a distance like isles of fire, while the wide intermediate vale was in darkness. On the other hand, the prospect extended as far as Donnesberg, in the Palatinate.

† Busching, viii. 481.

supply excellent marbles. Near Frudenstadt in the Black Mountains are mines of silver and copper.

The south-east of this portion of Germany is bounded by the high mountains of Bavaria and Salzia or Salzburg; being branches or continuations of the Swiss or Tyrolese Alps, but without general appellations. Ferber says that the high mountains of Bavaria, bordering on Tyrol, are granite; thence, as usual, argillaceous and calcareous in the lower parts*. Large pieces of grass-green quartz are found studded with red transparent garnets, and at Munchen or Munich are worked into elegant snuff boxes. Some hills near Regensburg, or Ratisbon, are calcareous; but towards Bohemia they consist of gneiss and granite. Of the Alps of Salzburg an account has been published by Vierthaler, whence it would seem that they exceed in height the Carpathian chain or the Pyrenees, and only yield to the Swiss and Tyrolese Alps. The highest summits are said to be the Sonnenblick, the Ankogel, the Wisbacherhorn, and the Loffler in the Stillupe. Even the next to these in height, the Hohe Nan, or the Hockhorn, is computed at 10,633 feet above the sea; and the Grosse Kogel in Rauris at 9,100; while several others exceed 8,000 feet. The mines of this country are celebrated; and in Zillarthal, or the vale of the river Ziller, on the west, is found the substance called Zillerthite by the French mineralogists†. The chief ridge of the Salzian Alps is on the south and east of the country, being an elongation of the grand chain, reaching from mont Blanc and mont Rosa along the north of Italy through Tyrol.

Forests. Considerable remains yet exist of the ancient forests which pervaded Germany. The German word *wald*, corresponding with the old English *weald*, denotes a forest; and such are found in the south of Mecklenburg, continued easterly in different parts of the Prussian dominions; but the timber of Dantzick is supplied by the navigation of the Vistula; and the sandy regions on the south of the Baltic seem little adapted to vigorous vegetation. The chief forests appear always to have extended along the middle regions of Germany, from the north-west towards the south-east. The Dromling wald is to the north of Magdeburg; but the Sollinger wald, the woody mountains of Hartz, the Lutten wald, the wide forest of Thuringia, may be said to be connected with the ancient forests of Silesia, hence extending far to the east through the centre of Poland and Russia. More to the south, in this part of Germany, are the Spessart forest, and others. In the portion south of the Mayn the vast Black Forest, and the woods along the Alb, are continued by others in various parts of Bavaria. In general the passion among the grandees for the chace of the wild boar, and other pleasures of hunting, has contributed greatly to the preservation of the forests.

Botany. As Spain is distinguished by its groves of cork trees and ilex, and Scandinavia by its fir woods, so is Germany remarkable for its deep and almost impenetrable forests of oak: not indeed that

* Tour in Italy, 329.

† The mountains of Zillerthal are chiefly of slate. Kirwan, 183. But the gold is found in gneiss.

this is the invariable characteristic of the country, for in an empire of such great extent, and so varied a surface, it must needs happen that the native vegetable productions on the shore of the German ocean should differ considerably from those in the recesses of the Black Forest or on the frontiers of Tyrol. There is, however, on the whole more uniformity than might be expected, and though perhaps few plants are absolutely peculiar to Germany, yet the abundance of some species, and the absence of others, forms a striking feature in the natural history of the empire.

To begin then with the hedges and roadsides, as these are situations that impress on a traveller at least the first, and probably the most durable idea of the flora of a country. It will be remarked that the *lilac* and *syringa*, which with us scarcely ever stray beyond the bounds of the shrubbery, are by no means of uncommon occurrence in the hedges of the north of Germany; the *cornel*, cornus mascula, the *sweet briar* and *cinnamon rose*, rosa eglanteria and cinnamomea, are also common. Of the smaller plants the principal are veronica romana, cerinthe minor, *lesser honeywort*; physalis alkekengi, *winter cherry;* ornithogalum luteum and minimum, *yellow* and *least star of Bethlehem;* Scilla amœna, Oenothera biennis, *evening primrose;* and coronilla varia.

The pastures and edges of woods afford several kinds of iris, especially Germanica, Sibirica and pumila, phalaris oryzoides in moist places, campanula bononiensis, viola mirabilis, gentiana Bavarica and spicata: several umbelliferous plants, as caucalis carnosa, and Ligusticum Peloponnesiacum: a number of bulbous rooted plants, particularly leucojum vernum, *snowflake;* galanthus nivalis, *snowdrop;* narcissus poeticus and pseudo-narcissus, *narcissus* and *daffodil;* two kinds of hyacinth, H. muscari and racemosus, and asphodelus ramosus, *branched asphodel.*

The vegetables of the woods and groves may be divided into the shrubby and herbaceous; to the first belong, besides the common forest trees and shrubs of England, sambucus racemosus, *branched elder;* Daphne cneorum, prunus mahaleb, Mespilus Germanica, amelanchier and cotoneaster, rosa pendulina, *pendent rose;* collutæa arborescens, Genista Germanica, Cytisus laburnum, *laburnum;* and Cytisus nigricans. Of the latter, the most worth notice are Panicum Germanicum and miliaceum, *millet grass;* asclepias vincetoxicum, astrantia major and minor, laserpitium prutenicum, convallaria maialis, verticillatum, &c., *lily of the valley, Solomon's seal;* hyacinthus comosus and botyroides, *clustered hyacinth;* lilium martagon, *martagon lily;* anthericum ramosum and liliago; trientalis Europæa, *winter-green;* dictamnus albus, *fraxinella;* asarum Europæum, Actæa spicata, aconitum napellus and Lycoctonum, *monks-hood;* helleborus viridis, anemone hepatica, *hepatica;* digitalis ambigua and serapias rubra.

The mountains being inferior in height to those of Swisserland, are destitute of many Alpine plants; among those which they do possess the following are the chief: stipa pinnata, *feathergrass;* Veronica latifolia, globularia vulgaris, cynoglossum Apenninum, androsace elongata and septentrionalis. Gentiana ciliata, *fringed gentian*; Campa-

nula thyrsoidea, Sium Hippomarathrum, sedum cepæa, anemone alpina, draba aizoides and arnica montana.

A few plants also worthy of notice are met with in the cultivated fields and vineyards, such as heliotropium europæum, *tournesol*; anagallis cærulea, *blue pimpernel*: camphorosma Monspeliaca, Saponaria vaccaria, and dianthus Carthusianorum, Carthusian pink.

Zoology. The zoology of this western half of Germany corresponds so much with that of the Austrian and Prussian dominions, that little need be added. The German horses are generally more remarkable for weight than spirit. The German wild boar is of superior size; and those of Westphalia are in particular estimation. In the north of Germany the lynx is sometimes seen; and the wolf is not unknown in the south.

CHAPTER II.

THE CHIEF GERMAN STATES ON THE NORTH OF THE MAYN.

SAXONY.—BRUNSWICK LUNENBURG.—HESSIA.—MECKLENBURG.—DUCHY OF BRUNSWICK.—CITY OF HAMBURG.—SMALLER STATES.—ECCLESIASTIC POWERS.

SAXONY. IN this division of Germany the elector of Saxony must be regarded as the chief potentate, his territories being computed at 11,680 square miles, the inhabitants at 1,896,000*, and the revenue at 1,283,333*l.* sterling.

NAME. The name is derived from the ancient nation of the Saxons, who in the middle ages held the greatest part of the north and west of Germany, and extended themselves thus far over Thuringia, towards the territories of the Lusitzi, a Slavonic tribe who gave name to Lusatia, and were repelled by Henry the Lion, duke of Saxony, in the twelfth century. It is not a little remarkable, as D'Anville† observes, that Witikind of Corvey, and Adam of Bremen, assert that the Saxons, with whose assistance Thieri king of Austrasia conquered Thuringia in 531, came from Great Britain, having landed at Hadeler between the Weser and the Elbe. This tradition seems to have been preserved by the people, as it is also reported by Eginhard, who had particular opportunities of information.

The countries comprised in the electorate of Saxony are, the duchy so called in the north, and Voigtland in the south; Lusatia in the east, and part of Thuringia in the west; with part of Misnia and Henneberg: being in length from east to west about 220 British miles, and in breadth from north to south about 130.

HISTORICAL EPOCHS. The ancient dukes of Saxony sprung from the kings who defended themselves with such valour against France. Otho III, duke of Saxony became emperor in 936, and resigned Saxony to the house of Stubenskorn or Billing, which ended in 1106; and soon after this potent dukedom passed by marriage to the house of Bavaria. Henry the Lion, duke of Saxony and Bavaria, 1139—1180, was of distinguished valour and power. In 1180 the eastern part of Saxony was assigned to Bernard of Ascania, the western

* In 1792, by Hoeck's calculation, there were 2,104,320: and the army 21,576 infantry and 6,180 cavalry, so as including other corps to form a total of 32,000. Revenue (A. D. 1800), 7,800,000 rix dollars.

† Etats Formés, p. 20.

half being given to the archbishop of Cologne. Wittenberg now became the usual residence. The house of Ascania ended with Albert III, 1422; and was followed by that of Misnia. Ernest and Albert, sons of Frederick II, divided the territories in 1485, and formed two branches bearing their names. The Ernestine branch of the house of Misnia, ruled till 1547, when John Frederic was deposed by Charles V, and the electorate assigned to Maurice of the Albertine branch, in which it continues. In order to gain the crown of Poland, the vain wish of the Saxon electors, Frederic Augustus, 1697, abjured the protestant religion; but neither he nor his successors have attempted to constrain the conscience of their subjects. The electorate suffered greatly by the invasion of the Prussians, in the war of seven years; but has since continued the tranquil and flourishing seat of arts and sciences.

Religion. The religion is the protestant, which was here introduced by Luther; and there are two bishopricks, Merseberg and Naumburg. The government is, as usual among the German princes, nearly absolute, but conducted with moderation through different councils. Yet there are states general of nobles, clergy, and burgesses, commonly assembled every sixth year to regulate the taxation; and Riesbeck regards the elector as a limited sovereign, as he can issue no laws without the consent of the states. Army, 24,000: and the political weight in this part of Germany next to that of Prussia, with which it is naturally connected, and which it cannot with safety oppose. This beautiful electorate may indeed well be an object of ambition to the Prussian monarchs; but the jealousy of other powers has prevented the conquest.

Literature. The language and literature of Saxony are the most distinguished in all Germany, most of the writers who have refined the language having been born, or having resided in this country, as Gottsched, who first introduced a superior style, and many others. Leibnitz, Wolfius, and other philosophers, were born or resided in Saxony; among the artists may be named Mengs, Hasse, and Gluck. Leipsick is a celebrated mart of German literature. There are many schools, colleges, and academies; among the latter the mineralogic academy of Freyberg, instituted in 1765, is esteemed the leading school of that science.

Dresden. The chief city is Dresden on the Elbe, of celebrated neatness, and about 50,000 inhabitants; but often exposed to the injuries of war*. It is first mentioned about the year 1020; and displays many manufactures, with the palace, and celebrated cabinets of the elector. Leipsick has near 30,000 inhabitants. Wittenberg has suffered greatly by the war, particularly in the siege by the Austrians, in 1760; and it is now chiefly celebrated as having been the residence of Luther.

Manufactures. The manufactures of Saxony are thread, linen, laces, ribbons, velvets, carpets, paper, colours derived from various minerals, glass, and porcelain of remarkable beauty, and vari-

* Mrs. Radcliffe did not visit Dresden; but by her account the praises of the German cities are generally unjust, as they impress an English traveller with the constant idea of darkness, dirtiness, and inconvenience.

ous works in serpentine stone. The country is also rich in native products, both agricultural and mineral; and beautiful pearls are found in the Elster in shells about six inches long*. With such advantages Saxony maintains a considerable inland commerce; and Leipsick is esteemed one of the chief trading towns of Germany.

FACE OF THE COUNTRY. The climate is so favourable that wine is made in Misnia. The face of the country, especially towards the south, is beautifully diversified with hill and dale; and its richness between Meissen and Dresden is esteemed to rival that of the north of Italy.

AGRICULTURE. The land is well cultivated; the products, all kinds of grain and vegetables, with hops, flax, hemp, tobacco, saffron, madder, and many others†.

RIVERS. The chief rivers are the Elbe, the Saal or Sala, the Mulda, the Pleisse, the Elster, with the Spree of Lusatia; all, except the Elbe and Sala, rising in the mountains between Saxony and Bohemia.

MOUNTAINS. The mountains are those of the Erzgeberg, already described in the general account of Germany; and there are several small forests supplying fuel for the mines and domestic purposes.

BOTANY AND ZOOLOGY. The botany and zoology are in general common with the rest of Germany.

MINERALOGY. The mineralogy is as usual particular, and few countries can boast of such fossil opulence. The mines of Johngeorgenstadt produce silver, tin, bismuth, manganese, cobalt, wolfram, &c. The other mines are those of Freyberg, Annaberg, Ehrenfriedersdorf, Altenberg, Eibenstock, Lauthenthal, Schneeberg, producing silver, copper, lead, and other metals. At Zwiknau is found the noted terra miraculosa: and at Schnekenstein, near Averback in the Voigtland, appears the topaz rock, unique in its kind. The tin of Saxony is not only a rare product, but is excellent. Jet is also found; and abundance of fine porcelain clay, with fullers' earth, marble, slate, serpentine, agates, and jasper; but when Busching, and other geographers, add diamonds, jacinths, rubies, sapphires, and opals, they speak in mere ignorance, and only mean as usual, limpid or coloured crystals. The annual product of the silver mines has been computed, in the German style, at four tons of gold‡, and is thought to be rivalled by that of the cobalt, converted into smalt or a blue pigment. The tin, copper, lead, and iron, are also very productive. Nor must coal and turf be forgotten among the mineral productions of this remarkable region. Yet Saxony cannot boast of mineral waters: and the chief natural curiosities are, it is believed, to be sought in the mines.

HANOVER. Next in consequence is the electorate of Brunswick Lunenburg||, or, as often styled from the capital, the electorate

* Busching, ix. 352. † See Hoeck's Tables for minute particulars.

‡ Or about 40,000*l.* In 1788 the product of all the mines was valued at 700,639 dollars. Hoeck.

|| On the continent written and pronounced Lunéburg; the second *n* being added in English merely to give sound to the *e*. The original duchy was annexed to the city of Brunswick and castle of Lunenburg, whence the conjunct title. Putter, vol. i. 220.

of Hanover, containing about 8,224 square miles, with 850,000 inhabitants, and the computed revenue 962,500*l.* sterling, while the military force is estimated at 20,000*. The various names of this country are wholly derived from the cities. It is situated in the circle of Lower Saxony, and possessed by the descendants of a branch of that great nation called the Ost Fali, or eastern Falians; while another branch to the west gave name to Westphalia. The countries comprised in the electorate of Hanover are chiefly the duchy of Lunenburg, Bremen, and Verden, and Saxe Lauenburg adjacent to Holstein on the northern side of the Elbe; with the countries of Calenburg and Grubenhagen in the south, and those of Diepholtz and Hoya in the west, and that of Danneberg in the east. The southern territory of Grubenhagen is detached from the rest by the principality of Wolfenbuttel, the bishoprick of Hildesheim, and the country of Halberstadt; the first being possessed by the duke of Brunswick, the second by its own bishop, and the third by the king of Prussia, having been transferred to the electoral house of Brandenburg by the treaty of Westphalia, 1648.

Extent. Hence it may be computed that the compact part of the Hanoverian dominions extends in length, east to west, about 180 miles: and in breadth north to south, about 100 miles; while the detached duchy of Grubenhagen, with southern Calenburg, or the country of Gottingen, is about eighty miles in length by thirty in its greatest breadth.

Historical Epochs. The electors of Hanover spring from the ancient dukes of Brunswick. Bruno I, margrave of Saxony A. D. 955, enlarged and embellished the city of Brunswick. In 1071 the emperor Henry IV, gave the duchy of Bavaria to Welph, son of Azo of Este, a powerful marquis in Italy, and of Cuniza, heiress of the first Welphs earls of Altorf in Suabia. His grandson Henry, duke of Bavaria, acquired Brunswick along with Saxony. In 1195, William, son of Henry the Lion, and of Matilda of England, acquired Lunenburg: and his son Otho, 1213, was the first duke of Brunswick and Lunenburg. His son Albert I, 1252, was surnamed the great. Magnus II, 1368, was surnamed Torquatus, from a large chain which he wore. His son Bernard retained Lunenburg; while Brunswick passed to Henry the second son, and continued in his descendants till 1634. The dukes of Lunenburg acquired some small portions of adjacent territory. Henry being put to the ban of the empire in 1521, was succeeded by his son, who only assumed the title of duke of Zell, a style which continued till the reign of George William, 1665. In 1617, Christian, duke of Zell, obtained possession of Grubenhagen. In 1692, George William duke of Zell consented that the electorate, instituted in favour of his family, should be conferred on his younger brother, as he had no male heir. Ernest died in 1698, having married Sophia, daughter of Elizabeth, daughter of James I, of England. He was succeeded by his son George Lewis, elector, 1698, and king of England, 1714. The later history of Hanover is little remarkable, except by repeated devastations

* This army consumes most of the revenue. See Hoeck, who computes it at 25,870.

of the French: and in the recent war it was only secured by the powerful interference of the king of Prussia.

RELIGION. The religion is the Lutheran: there are about 750 parish churches, with seven superintendents. The government is now conducted by a council of regency, and there are provincial states, though rarely summoned.

POLITICAL IMPORTANCE. The political importance of this electorate cannot be highly estimated in the present state of German affairs; and from France or Prussia it can only be protected by the powerful mediation of England.

LITERATURE. The literature of this country has deserved considerable applause, since the institution of the university of Gottingen by George II: it was founded in 1734, and solemnly opened 1737.

CHIEF CITIES. The chief city is Hanover, in the northern part of the principality of Calenburg, situated on the river Leine, amidst numerous gardens and villas. This city is first mentioned in the twelfth century; and is slightly fortified, containing about 15,500 inhabitants. In the new city, on the left of the Leine, is a library, particularly rich in books of history and politics.

GOTTINGEN. Gottingen stands on the same river, containing about 7,600 souls, a neat and pleasing town, first mentioned in the thirteenth century. Verden, near the junction of Aller with the Weser, is of small account, but has recently sent some vessels to the Greenland fishery under the Hanoverian flag. Other towns are Lunenburg, which imparts its name to the electorate; Lauenberg, Zell, with Einbeck and Osterode in the province of Grubenhagen. The manufactures and commerce of this electorate are pretty considerable, in metals from the Hartz, linen, cotton, some broad cloths, &c. The silver fabrics of Zell are celebrated in Germany. The chief exports are metals, coarse linens, timber, peat, with some cattle and grain.

FACE OF THE COUNTRY. The aspect of the country is plain, partaking somewhat of the sandy nature of Brandenburg, except in the south, where rise the lofty and picturesque mountains of the Hartz.

AGRICULTURE. The agricultural products are wheat, rye, barley, oats, peas, haricots, and pot-herbs of all kinds; with abundance of potatos, good fruits, flax, hemp, tobacco, madder, &c. Wood abounds both for fuel and architecture, and affording considerable quantities of tar and pitch. Bees are particularly tended. Horses, cattle, and sheep are numerous; and game far from rare.

RIVERS. The chief river is the Elbe towards the north; and the Weser and Leine on the west; with the Aller and Ilmenau in the centre. Smaller streams are the Loha, the Lutter, the Fuse, with the Siber, which pervades the Hartzwald in the south. There are a few small lakes, as that of Diepholtz, and Stinhuder; but none equal in size to those in the adjacent province of Mecklenburg. The Hanoverian dominions contain many small forests, and woods, besides those of the Hartz, already described in the enumeration of the German mountains.

MINERALOGY. The mineralogy is rich, consisting of silver, copper, lead, iron, cobalt, zinc; with marble, slate, coal, turf, and

lime-stone, the last particularly from the hill of Kalkberg near Lauenburg. Two curious mineral substances, boracite and staurolite, are found, the former in the Kalkberg, the latter at Andreasberg in the Hartz: which region likewise presents several singular features of nature, as the cavern of Blackenburg, the termination of which has never been explored, and the cave of Hamelen*.

Having thus described, at some length, the two chief and leading principalities on the north of the Mayn, a few others, the next in power, may be briefly mentioned; for it would be a vain waste of the reader's attention, and indeed only render his knowledge more confused and imperfect, if even short accounts were attempted of the 300 princes and states which crowd the labyrinth of Germany: princes whose territories under a monarchy would sink into the geographical obscurity of those of a peer or landed gentleman; and states which may be more aptly sought in a gazetteer, or in the minute and laborious pages of Busching, whose chorography of Germany is the most complete part of his work, and may be recommended to the reader who wishes for ample details.

Hessia. In this secondary view of the north of Germany the first place must be assigned to Hessia, a country of no mean extent nor fame. Some districts, as usual, being assigned to princes of the family, the ruling state is denominated Hesse Cassel, so called from the capital. This territory is about eighty British miles in length, and nearly the same in breadth: miles square, 2,760, with 750,000 inhabitants†, military force, 12,000.

Names. The derivation of Hessi from the ancient Catti is arbitrary; and it is now conceived to originate from the river Esse, which runs into the Fulda: but this land was a seat of the ancient Cattians. This country is generally mountainous; but there are many pleasant vales, sometimes containing vineyards, and fields fertile in corn and pasturage.

Products. It abounds in game and fish, and there are many fossils and minerals: the sands of the Eder contain particles of gold; and there was formerly a mine of that metal, but of small account, near Frankenberg. There are also found silver, copper, lead, alum, vitriol, coal, fine clays, with veins of marble and alabaster, and some medicinal waters. Detached parts are watered by the Rhine and the Mayn; the smaller rivers are very numerous. There are states of three orders, nobles, clergy, and burgesses from Cassel, Marburg, and other towns. The religion is the reformed, with two or three superintendents. The universities are those of Marburg and Rinteln, and that of Giessen belonging to Hesse Darmstadt, ruled by another branch of the family.

* The bishoprick of Osnabruck in Westphalia, may be considered as an appanage of Hanover, adjoining to the county of Diepholtz. By the treaty of Osnabruck, 1648, it was decided that this bishoprick should be possessed alternately by a catholic and a protestant, the former at the choice of the chapter; but the latter always a prince of the house of Hanover, who was to have the civil and criminal superiority; while the ecclesiastic affairs are administered by the archbishop of Cologne. Inhabitants about 120,000: revenue 26,250*l.*

† Hoeck says 700,184, including Hesse-Darmstadt.

There is some trade from the natural products, and a few manufactures of linen, cloth, hats, stockings, &c. The chief city is Cassel, which contains about 22,000 inhabitants, and is pleasing, though often injured by war; the Hessians being more remarkable for exposing their lives abroad, than for a vigorous defence of their native country. Hanau is also a considerable place; and the country so called is supposed to contain 100,000 souls.

MECKLENBURG. The duchy of Mecklenburg is supposed to contain 4,800 square miles, with 375,000 inhabitants, or by Hoeck's account 300,000. It is divided into two parts, known by the additions of Schwerin and Gustro, full of lakes, heaths and marshes: and the soil being sandy, produces little but rye and oats, yet many parts might be capable of great improvement*. This country was long possessed by the Veneti, or Wends, being the furthest western settlement of that Slavonic nation; and the peasants remain in a state of servitude, as was the case in Denmark, and many parts of Germany. The states, consisting of nobility and burgesses, are assembled yearly to regulate the taxation. The religion is the Lutheran, with six superintendents; and an university at Rostock. The manufactures are wool and tobacco; the exports, partly by Lubec, partly by Hamburg, are grain, flax, hemp, hops, wax, honey, cattle, butter, cheese, fruits, feathers, dried geese, tallow, linseed, wool, and timber. The ruling family descends from the old Venedic sovereigns. The branch of Mecklenburg Strelitz began in the end of the seventeenth century, and enjoys Ratzburg, Stargard, and other provinces.

BRUNSWICK. The duke of Brunswick possesses a territory of 1,472 square miles, with 170,000 inhabitants; the chief city being Brunswick, which contains 22,000: but his territory is called the principality of Wolfenbuttel from a town of far less importance. This principality affords a specimen of German geography, being itself enchased in the electorate of Hanover, while the bishopric of Hildesheim, and the country of Halberstadt, pervade the centre of Wolfenbuttel. The duke of Brunswick shares a part of the Hartz, and its important mines†: and the rest of the country resembles the electorate of Hanover. Here is a rich convent of nuns at Gandersheim of the Lutheran persuasion, the abbess being generally a princess of the family. There are several small manufactures; and the strong beer of Brunswick, called mum, is exported from Hamburgh. The electoral family, and the dukes of Brunswick, alike spring from Magnus the pious 1463; but the lasting division of the principalities of Brunswick Lunenburg, and Brunswick Wolfenbuttel, must be traced from the seventeenth century. The former branch having ascended the English throne, the latter has since that event assumed the leading title of Brunswick.

* Riesbeck, iii. 69. observes, that Mecklenburg is more diversified with woods, lakes, &c., than Brandenburg, though there be no appearance of a hill in either. He says, Ib. 123, that from Hamburgh to Hanover almost the whole country is a deep sand.

† Recently exchanged with Hanover for another district. The clear product of the mines of the Hartz is computed at 453,000 dollars. The dollar may in general be estimated at 3*s.* 4*d.*, and the florin at 2*s.* sterling. Tables at the end of Putter, &c.

HAMBURGH. Nor must the city of Hamburgh be omitted, being, after Vienna and Berlin, the third city in Germany, and supposed to contain 100,000 inhabitants, or by Hoeck's account 95,000; while no other, except Dresden and Frankfort on the Mayn, contain more than 30,000. It was fortified by Charlemagne A. D. 808*. The Elbe is here, including the islands, near a mile broad; and, on the other side of the city, the Alster forms a bason chiefly used in parties of pleasure. The houses are rather commodious than elegant, and there are few fine streets, the population being overcrowded on account of the fortifications, built in the old Dutch taste, with spacious ramparts, planted with trees. It is ruled by a senate of thirty-seven persons, the form being aristocratic. The religion is the Lutheran, and including the territories, the clergy amount to fifty-three. There are considerable breweries, and works for refining sugar, with some manufactures of cloth. Formerly the trade chiefly consisted of linens, woolens, wine, sugar, coffee, spiceries, metals, tobacco, timber, leather, corn, dried fish, furs, &c.; but at present it is the great mart of the commerce of the British Isles with the continent. The bank was founded in 1619; and the numerous libraries do honour to the taste of the inhabitants. Its chief dependencies are the river of Alster, the bailliage of Ham, some isles and lowlands on the Elbe; and, besides some districts acquired from Holstein, the bailliage of Ritzebuttel, on the north of the duchy of Bremen, including the port of Cuxhaven, and the isle called Neuewerk, situated opposite to that port†.

SMALLER STATES. In this northern half of Germany are also Oldenburg, now a detached principality, possessed by 75,000 inhabitants; Swedish Pomerania, 103,000; the principality of Anhalt, 100,000; the territories of the princes of Nassau, 130,000; of the princes of Schwarzburg in Thuringia, 100,000; the princes of Waldeck, on the north of Hessia, 80,000; the counts of Lippe and Westphalia, 95,000; the counts of Reuss in Voigtland‡, which they share with the elector of Saxony, 66,000; and the city of Frankfort on the Mayn, 36,000‖.

ECCLESIASTIC POWERS. The other chief powers are ecclesiastic: 1. The elector of Mentz, the first in the empire, has lost his capital city, and Worms on the left bank of the Rhine; but he still holds a large territory on the Mayn, with Erfurt, a city of 15,000 inhabitants in the northern region of Thuringia, and the surrounding domain. 2. The elector of Triers, or Treves, whose extensive dominions, being chiefly on the left of the Rhine, are seized by the French.

* This city, with Lubeck and Bremen, alone retain the Hanseatic league, founded 1241, and joined by a great number of cities, for the protection of their trade and commerce. This league declined in the end of the fifteenth century. Hamburg is supposed to be the third commercial city in Europe, and is certainly the first in Germany. By the Elbe and its tributary streams, it maintains a great inland commerce. See Nugent, i. 49.

† Busching, xi. 146-168.

‡ Or the *terra advocatorum*, so called from an office in the empire, which began in the tenth, and ended in the fourteenth century, being hereditary in the family of Reuss. Busching, x. 267.

‖ These numbers are now increased as appears from Hoeck, who adds that the imperial city of Bremen has now 40,000 inhabitants, and Lubeck 30,000.

3. The elector of Cologne, whose territories are chiefly in the like predicament, but who possesses the province called the duchy of Westphalia. 4. In Westphalia are the bishopricks of Munster, of Osnabruck, and Paderborn; the rich bishoprick of Liege is immerged in the French conquests. 5. In Lower Saxony, that of Hildesheim. 6. In the Upper Rhine, that of Fulda. 7. The large bishoprick of Wurtzburg, in Franconia, is chiefly on the north of the Mayn. The ecclesiastical electorates were computed each at more than 300,000 inhabitants; and the bishopricks from that of Hildesheim, the smallest, 70,000; to Wurtzburg, 200,000. It is supposed that the emperor, and the king of Prussia, well secularize these extensive sees, founded and enlarged by the policy of Charlemagne and his successors, partly for the more speedy and effectual conversion of the pagans in the north of Germany, and partly to balance the rising power of the aristocracy, which afterwards proved so ruinous to the empire.

CHAPTER III.

THE GERMAN STATES ON THE SOUTH OF THE MAYN.

ELECTORATE OF BAVARIA CONJOINED WITH THE PALATINATE.—DUCHY OF WURTEMBURG.—ANSPACH.—SALZIA.—SMALLER STATES.—ECCLESIASTIC POWERS.

AS in the northern division of Germany there are, exclusive of the Prussian dominions, two preponderating powers, the electors of Saxony and Hanover; so in the southern division, exclusive of Austria, there are two superior potentates, the Elector Palatine and of Bavaria (these electorates being now conjoined), and the duke of Wurtemburg.

BAVARIA AND PALATINATE. The elector of Bavaria and the Palatinate is the chief of all these secondary powers, his dominions being computed at 16,176 miles square, with 1,934,000 inhabitants*; while those of the duke of Wurtemburg yield as much to those of the elector of Hanover.

PALATINATE. The French having seized more than half of the Palatinate on the left bank of the Rhine†, a mountainous region, but abounding in mines of quicksilver, and other valuable metals, the remaining part on the right bank of the river, is about twenty-four British miles in length, by the same at its utmost breadth; but contains the best part of the principality, pervaded by the river Necker, producing excellent wines, and enriched by the cities of Manheim, and Heidelburg.

HISTORICAL EPOCHS. The first palatine of the Rhine was Eberhard of Franconia, A. D. 985. The Lutheran religion was established in 1556; and in 1563 appeared the famous catechism of Heidelberg: but since 1685, the Catholic system has predominated. In the thirteenth century the house of Bavaria acquired the Palatinate by marriage, and from it the modern family descended. Frederic V, Elector Palatine, 1610, married Elizabeth, daughter of James I, of England; and aspired to the crown of Bohemia, but was vanquished, and the electorate transferred to the house of Bavaria. Yet, by the

* Hoeck computes Bavaria at 1,339,900, the Palatinate at 305,000.

† The elector Palatine has also lost the duchy of Julich, or Juliers. Yet he retains the duchy of Berg, on the right bank of the Rhine, with its noted capital Dusseldorf. Hoeck computes Julich at 192,217; Berg, 261,504 souls. See Render's Tour in Germany, 1801, 2 vols. ii. 137.

treaty of Westphalia, 1648, his son regained a part of his dominions, and was created an eighth Elector of the empire. This branch failing in 1685, was succeeded by the collateral branch of Deux Ponts. Wolfgang of Deux Ponts left two sons, Philip and John, the first being the source of the new Palatine dynasty, and the other of the house of Deux Ponts. In 1693, the Palatinate was rendered almost a desert by the notorious ravages of the French. The Palatinate and Bavaria, have recently been inherited by the branch of Deux Ponts, the son of the elector being now nominal duke of Deux Ponts*.

BAVARIA. The history of Bavaria is yet more important.

HISTORICAL EPOCHS. This country was governed by dukes, under the kings of Austrasia; and in the ninth century, princes of the Francic family, assumed the style of Kings of Bavaria, while Liutpold, 889, was the first duke; and his progeny extend to the present day, though interrupted in 946, when, Berthold dying without children, the emperor Otho gave Bavaria to his brother Henry of Saxony. In 1071, Welph, son of Azo of Este, became duke of Bavaria; which, in 1138, passed to the house of Austria, but in 1154, returned to the house of Welph, in the person of Henry the Lion. In 1180, it finally returned to the first family, by the succession of Otho of Wittelbach, a descendant of Arnolf, second duke of Bavaria, after the family had been unjustly deprived for more than two centuries. The emperors Lewis, 1314, and Charles VII, 1740, were of this family.

EXTENT. The duchy of Bavaria is divided into Upper and Lower, and what is called the Higher Palatinate (or that of Bavaria). The length from north to south is somewhat interrupted, but may be about 150 British miles, and the breadth about 120. Upper Bavaria is, in a great degree, mountainous; and covered with forests, interspersed with large and small lakes. Lower Bavaria is more plain and fertile.

MINERALOGY. There are mines of silver and copper near Podenmais, in the bailliage of Viechtach, and of lead at Reichenthal, with many quarries of marble, and mineral springs. But the chief mineral riches of Bavaria consist in the salt springs at Traunstein, which pervade mountains of saline earth, like those at Hallen in the archbishoprick of Salzburg, and occupy many people in productive

* In 1385, Everard, last earl of Deux Ponts, sold the reversion of his domain to the Palatine family. In 1444, it was united with Veldenz. Thus the family of Deux Ponts also spring from that of Bavaria, whose source is Otho of Wittelbach, who obtained the Duchy 1180, on the proscription of Henry the Lion, duke of Saxony and Bavaria. Otho, earl of Wittelbach, (a castle in the duchy of Bavaria near Aicha, on the Paar, which runs into the Danube to the east of Ingoldstadt,) was descended, in the eighth degree, from Arnolf, earl of Scheyren, second son of Arnolf the bad, the second duke of Bavaria, A. D, 907, son of Liutpold the first duke, whose origin has not been ascertained, though the stock of royal families; for in 1654, Christina, the last of the house of Vasa, transferred the Swedish crown to Charles, duke of Deux Ponts, her cousin, his father having married Catharine, daughter of Charles IX, of Sweden. Of this family were Charles XI, and XII; and Ulrica who married Frederic, prince of Hessia, afterwards king of Sweden; followed in 1751, by the present family of Holstein, sprung from the royal Danish house of Oldenburg.

industry. There are other springs at Reichenthal*. The mountains of Upper Bavaria may be considered as branches of the Alps. The chief rivers are the Danube, the Inn, the Iser, the Lech, and the Nab; and in the Palatinate the Necker. The religion is the Roman Catholic, which, as usual, damps the spirit of industry; and the manufactures are of small account, the chief exports being corn and cattle.

REVENUE. The revenue is computed at 1,166,600*l.*; and the military force at 12,000: both being greatly inferior to the smaller electorate of Saxony.

CITIES AND TOWNS. The chief city is Munich, esteemed the most elegant in Germany, with 38,000 inhabitants; in Lower Bavaria are Landshut and Strauben. Ratisbon, or Regensburgh, *Regina*, though seized by the elector of Bavaria, 1703, is regarded as a free and imperial city.

MANHEIM. In the palatinate of the Rhine is Manheim, supposed to hold 24,000 inhabitants; and Heidelberg, noted for wines, and a capacious tun, and formerly for a valuable library transferred to the Vatican. This city, amidst the infamous destruction of the Palatinate, was reduced to mere walls, but afterwards restored by the industrious Lutherans.

BAVARIA. The Bavarians are little distinguished in literature; but are a vigorous race adapted to the fatigues of war. There is, however an university at Ingoldstadt, and an academy of sciences at Munich. The states consist, as usual, of clergy, nobility, and burgesses; but before the accession of the house of Deux Ponts, the administration had become the most lethargic of any in Germany†.

POLITICAL IMPORTANCE. Hence its political importance has in some measure declined: and in the dangerous situation between France and Austria, it may be difficult for this power long to preserve a shadow of independence.

WURTEMBURG. The second potentate in the south is the duke of Wurtemburg, whose dominions are computed at 3,200 square miles, with 600,000 inhabitants.

NAME. This duchy derives its name from the castle of Wurtemburg, situated in the bailliage of Canstadt. There were earls of Wurtemburg in the twelfth century; and in 1495 the ducal title was conferred on earl Everard. In case of the extinction of the family, the house of Austria pretends to the succession, and even now assumes the title and arms of Wurtemburg. The dukedom of Teck was added in the fourteenth century. The revenue is computed at 245,000*l.*, the military force at 6,000. This duchy forms the most considerable and fertile part of the circle of Swabia; and is indeed, after Saxony, one of the best in the empire. The mountains of the Black Forest on the west, and those of the Alb on the south and east, not only diversify the face of the country, but supply timber, fuel, and mines.

PRODUCTS. The chief grain is spelt, and some barley, and wheat, with flax, lint, &c. and the fertility suffices even for export.

* Voyage d'un Français aux salines de Bavière et de Salzbourg en 1776. Paris an V.; the author is Barbé Marbois.

† By the accounts of Riesbeck, and others, the government of the Palatinate of the Rhine, while detached, was miserable.

The wines of the Necker are not so abundant as to prevent the use of cyder.

MINERALOGY. There are mines of silver and copper near Freudenstadt, and at Konigswart; of silver at Konigstein; and of copper at Guttach, near Hornberg. Iron is also found, but was chiefly brought from mount Beliard, now perhaps lost in the French acquisitions. Cobalt, sulphur, coal, porcelain, clay, marble, alabaster, black amber, or rather obsidian, from the Alb, with the salt works at Sulz, constitute the other mineral productions*. There are many warm baths and medicinal springs, and the chief river is the Necker, which, with the Nagold, and its other tributary streams, enlivens and fertilizes the duchy.

STATES. The states consist of fourteen superior clergy, and the deputies of sixty-eight towns and bailliages. The religion is the Lutheran, with some Calvinists, and some colonies of the Vaudois. The church is ruled by four superintendents, who are styled abbots, and thirty-eight rural deans: a synod is annually held in the autumn.

EDUCATION. Education, and ecclesiastical studies in particular, are favoured by laudable institutions, not to be found in any other Protestant country. The seminary of Tubingen used to contain about 300 students; and there is an academy of education at Stutgard.

MANUFACTURES. There are manufactures of pottery, glass, woolen, linen, and silk; which, with the natural products of the country, supply a considerable export: the imports are by Frankfort on the Mayn.

STUTGARD. The chief city is Stutgard, agreeably situated on a rivulet, which flows into the Necker, and the ducal residence since the year 1321. Some of the buildings are elegant, and there is a cabinet of natural and artificial curiosities. It has not recently suffered much from war, but was greatly injured by a conflagration in 1761. The second town is Tubingen on the Necker, with an university founded in 1477. The other towns are small but numerous, and the villages thickly placed in a populous and flourishing country.

ANSPACH. Among the secondary powers in this southern division of Germany, must first be named Anspach, or Onolsbach, which, with Bareuth, maintains a population of 320,000 on 2,320 square miles. These regions are mountainous and sandy; but near the Mayn yield good wines. The chief mines are of iron, the others being neglected. Near the Fichtelberg, Bareuth produces a variety of beautiful marbles, and some curious minerals. The principality of Bareuth is also known by the name of Culmbach; and, with Onolsbach, forms the chief power in Franconia, now annexed to the sovereignty of Prussia.

SALZIA. The country of the Salz, also called Salzia, and the archbishoprick of Salzburg, is a compact and interesting region, about 100 English miles in length, and sixty at its greatest breadth; computed at 2,880 square miles, and a population of 250,000; by Hoeck's

* There is a remarkable cavern at Pfulingen, and another in the Albian mountains. They are here called *locis*, or *lochs*. Keysler, i. 116.

account only 200,000. The archbishop is primate of all Germany, the see being founded by St. Rupert, an Englishman, in 716*. The chapter consists of twenty-four persons, of noble extract; and the house of Austria has contrived that a great majority should be from her domains. No tax can be imposed without the consent of the provincial states, composed of clergy, nobility, and burgesses, the deputies being at the same time the tax-gatherers†. In political affairs, this see is wholly ruled by Austria, there being twenty-two Austrians in the chapter. The chief suffragans are the bishops of Chiem; of Gurck, and Lavant, in Carinthia; and Seckau in Stiria; who all swear fidelity to the archbishoprick, which possesses many fair lordships in Austria, Stiria, and Carinthia.

SALZBURG. Salzburg, the ancient Juvavum, has an university, with about 20,000 inhabitants; the other towns being of little moment. The Roman Catholic system has banished many industrious inhabitants, who have chiefly taken refuge in the Prussian dominions.

MINERALOGY. The salt works at Hallen, about twelve miles south of Salzburg, are very lucrative. They are in the mountain of Durenburg, which is excavated in galleries, occasionally filled with water, till it be impregnated with saline particles‡. There are also in Salzia some mines of silver and lead; and one of gold at Galstein, and others along the northern side of the Alps to Zillarthal, so that the archbishoprick is supposed by Bergman to yield only to Hungary in the production of this precious metal. The copper is often impregnated with gold, which used to be a source of gain to the melters of Nurenburg and Augsburg. It is said that emeralds and beryls are here found in micaceous schistus. Among the minerals may also be named the *bitter spath*, or muriatic spar, steatite, serpentine, talc, lapis ollaris, asbestos, actinolite, sappare, and thallite, or green schorl. The asparagite of Werner is only found in Zillarthal in talc of a greenish white. There are mineral waters in the vale of Grossarl, from a calcareous source as usual; but it is singular that the warm baths of Wildvad, in the valley of Gastein, proceed from rocks of granite and gneiss‖.

SMALLER STATES. This grand southern division of Germany also contains the territories of the Margraves of Baden, 832 square miles, with 200,000 inhabitants; the lands of Hesse Darmstadt, belonging to another reigning branch of the house of Hessia, residing at Darmstadt, and also possessing territories on the northern side of the Mayn, both estimated under the article of Hessia. The Imperial city of Nuremberg, has considerably declined, but it still contains about 30,000 souls, while Ulm has not above half the number. Austria enjoyed many extensive territories in Suabia, some even bordering on the Rhine, and several on both sides of the Danube: and these detached provinces were absurdly styled Further Austria. Among the smaller secular territories in that circle, may be named those of the house of

* Putter, i. 44. Busching, &c. St. Boniface afterwards founded many bishopricks in the south of Germany. Columban and Gallus were the apostles in Swabia. Kilian in Franconia, Wilibrod in Frisia, were all from England and Ireland.

† Barbé-Marbois, p. 101. ‡ Ibid. 60. 73.

‖ Journal des Mines, No. 47. p. 833, &c.

Truchsess, so called, as being hereditary cup-bearers of the empire, and otherwise styled counts of Waldburg. The counts Fugger, descended from the ancient opulent merchants of that name, possess estates on the west of the Lech. To enumerate the other small secular principalities would only obstruct the intention of this description, which is to impress on the memory the more important, which can alone claim notice in the page of history; while the smaller princes may indeed be named as generals, but their territories are beneath the notice of general geography, and have as little claim to historical regard, as the estates of peers under a monarchy.

Ecclesiastic Powers. But as the intention of secularizing he numerous and wide ecclesiastical territories in Germany must engage much political consideration, it is proper to add here, as has been done in the former chapter, a list of the chief sees to the south of the Mayn. 1. The archbishoprick of Salzburg, being among the leading powers, has been already described. 2. The large bishoprick of Wurtzburg, being chiefly on the north of the Mayn, has been mentioned in the former chapter: the next in importance, but often held in conjunction with the former, is that of Bamburg, supposed to contain 180,000 inhabitants. 4. The bishoprick of Speyr, or by the French enunciation Spire, was supposed to contain 50,000, but of these probably one half, on the west bank of the Rhine, are now subject to France. 5. The bishoprick of Aichstett in the southern extremity of Franconia. 6. Suabia presents the large and opulent bishoprick of Augsburg, with an extent of territory about seventy English miles in length, but the medial breadth not exceeding twelve. 7. Of Constance, whose territories also extend into Swisserland. 8. A great part of the bishoprick of Strasburg. 9. The large abbatial territories of Kempten, Buchau, and Lindau; with the priory of Ellwangen in the north. 10. The bishoprick of Passau in Bavaria, is computed at 25,000 inhabitants. 11. That of Freysingen, with the county of Werdenfels, near the Rhætian Alps, at 23,000. 12. The bishoprick of Ratisbon, which is of small extent. The chapters of Mentz, Wurtzburg, and Luttich, or Liege, preserved some appearance of freedom; while the others were chiefly influenced by the power of Austria*.

For a more minute and particular view of all the German states, including the Austrian and Prussian dominions, than was consistent with the nature of this work, the reader may be referred to the recent laborious publication by Hoeck, who has carefully indicated the sources whence he derives his intelligence. It must be added, that his work is merely what is called in Germany statistic, being a series of tables

* The German secularizations are not yet adjusted: according to floating and uncertain rumours, Austria is to have Salzburg and Berchtoldtgaden. Prussia; Paderborn, Lauenberg, and Eichsfeldt. The elector of Hanover; Hildesheim. Landgrave of Hessia; the towns of Ameneburg, and Fritzlar. The elector of Bavaria; Bamberg, and Wurtzburg. It is also reported, that the former Stadtholder is to obtain some provinces on the Rhine; while the former Grand Duke of Tuscany is to hold Venice as an Austrian appanage.

In the treaty of Amiens, the Rio *Branco*, p. 662, seems merely the Portuguese pronunciation of Rio *Blanco*, in which case the extension of French Guinea is very great.

presenting the extent of each country and district, in square miles, the number of towns, villages, and houses, the population, the natural productions, the manufactures, the commerce, the finances, number of universities, schools, and state of the army. The other geographical topics are, by the Germans who invented the term, considered as foreign to the science of statistics.

ITALIAN STATES.

CHAPTER I.

GENERAL DESCRIPTION OF ITALY.

DIVISIONS.—BOUNDARIES.—EXTENT.—ORIGINAL POPULATION.—PRESENT POPULATION.—FACE OF THE COUNTRY.—RIVERS.—LAKES.—MOUNTAINS.—BOTANY.—ZOOLOGY.

THE classical and interesting country of Italy has been so repeatedly described, that it has become familiar even to the common reader. As it is superfluous to write without adding to knowledge, this description shall, in consequence, be restricted to very narrow limits: and will also of necessity be somewhat abridged by the present unsettled state of the country, which, on many topics, scarcely leaves materials even for conjecture. Hence the political and civil departments of geographical description are almost obliterated; and this brief account shall chiefly delineate those lasting features of nature, which no political change can influence.

DIVISIONS. Italy may be regarded as having been, in all ages of history, divided into three parts, the southern, the central, and the northern. The southern part having received many Greek colonies, was honoured with the ancient appellation of Magna Græcia: the centre was the seat of Roman and Etrurian power; while the northern was the Cisalpine Gaul. In the middle ages, the kingdom of Lombardy, afterwards sub-divided, and that of Naples, occupied the two extremities, while the church, and Tuscan states, held the centre. In more modern times, the most distinct division has been the kingdom of Naples in the south: but the centre, and the north, have passed into various sub-divisions and denominations. For which reasons, and

the present uncertain state of the country, the northern and middle parts shall be considered rather geographically than politically; the chief mouth of the Po being assumed for the limit on the east, thence following that river till it is joined by the Panaro, (the ancient Scultenna), up to its source near Castiglione; and thence in a westerly line to the gulf of Spatia, thus tracing nearly the boundary between the former states of the Church and those of Modena, while the gulf of Spatia, (Portus Lunensis), almost the eastern reach of the Genoese territory, presents a natural and remarkable boundary in the west. These divisions shall be briefly considered in the succeeding chapters, while this is dedicated to the general description of Italy.

The boundaries of this renowned country are deeply impressed by the hand of nature, in the Adriatic and Mediterranean seas, and the grand barrier of the Alps, which divide it from France, Swisserland, and Germany.

EXTENT. The length of Italy from mont Rosa, the highest summit of the Italian Alps, to the Cape de Leuca, is about 670 British miles; while the medial breadth between the Adriatic and Mediterranean is about 100; but from the Adige, the recent limit of Austrian power, to the eastern frontiers of the new French departments of Liman, and mont Blanc (formerly Savoy), the breadth is about 200 miles.

ORIGINAL POPULATION. The original population of the south consisted of Pelasgi from the Peloponnesus: the northern part of Illyrians, who were succeeded by German Gauls; and the Etruscans of the centre are said to have been of Lydian extract. The Romans seem to derive their origin from the early Greek colonies; and their language was regarded as an Æolic dialect of the Greek: but as they proceeded from the most barbarous part of Greece at an early epoch, it was a considerable time before their manners, rendered ferocious by incessant wars, assumed a tint of Grecian civilization. The successive population, progressive geography, historical epochs, and antiquities of Italy, are familiar to every reader, but will occasionally be briefly commemorated in the succeeding chapters. It is almost superfluous to add that the religion is the Roman Catholic.

POPULATION. The present population of Italy, with the islands of Sicily, and Sardinia, cannot be estimated at more than 13,000,000*. The kingdom of Naples and Sicily contain about 6,000,000: the central part about 3,000,000; and the northern about four. The manners, customs, and dialects are various and discordant, though the general language be the Italian, esteemed the purest in Tuscany, while the enunciation is most perfect at Rome.

FACE OF THE COUNTRY. Italy presents such a variety of scenery, decorated with such noble architecture, and venerable remains of ancient art, amidst a climate generally serene, though liable to violent rains, and such delicious tints of aerial perspective, that the painter of landscape is enraptured, and can render but feeble justice to the picturesque features and glowing hues of nature. In the north the sublime scenery of the Alps is contrasted with the fertile plains,

* Boetticher.

through which many classical streams flow into the Po. In the centre there are many marshes and standing waters, which occasion what is called the *mal aria*, or a pernicious distemperature of the air; but the varied ridge of the Appenines and the beautiful prospects of Florence and Tivoli excite universal admiration. A great part of the kingdom of Naples is mountainous; but the country generally beautiful; yet in addition to the fiery eruptions of Vesuvius and Etna, it is exposed to the terrible effects of frequent earthquakes; and the enervating sirocco*.

Rivers. Italy is intersected with rivers in almost every direction, of which the Po is by far the most large and extensive. This noble river, celebrated from the early ages of Grecian mythology, and called by the ancients Padus and Eridanus, rises from mont Vesula, or Viso, on the very confines of France and Italy, nearly in the parallel of mont Dauphin, in Dauphiné, and Saluzzo, in Piedmont, being almost central between them, at the distance of about eighteen English miles from each. Thus descending from the centre of the western Alps, the Po passes to the north-east of Saluzzo, by Carignan, to Turin; receiving even in this short space many rivers, as the Varitta, Maira, and Grana from the south; and from the north the Felice, Sagon, and others. Most of these streams having had a longer course than what is called that of the Po, the Maira, for instance, might perhaps be more justly regarded as the principal river: nay the Tanaro, which flows into the Po some miles below Alexandria, might perhaps claim, in the river Stura, a more remote source than the Po itself. After leaving the walls of Turin, the Po receives innumerable rivers and rivulets from the Alps in the north, and the Appenines in the south. Among the former may be named the Doria, the Tesino, the Adda, the Oglio, the Mincio: to the east of which the Adige, an independent stream, descends from the Alps of Tyrol, and refusing to blend his waters with the Po pursues his course to the gulf of Venice. From the south the Po first receives the copious Alpine river Tanaro, itself swelled by the Belba, Bormida, and other streams; the other southern rivers are of far less consequence, but among them may be named the Trebbia, the river of Parma, and the Panaro, which joins the Po at Stellato, on the western frontier of the former territory of Ferrara. The course of the Po may be comparatively estimated at about 300 British miles; so that when Busching pronounces it the second river in Europe, after the Danube, he must have forgotten the Rhine, the Elbe, the Oder, the Vistula, not to mention the Loire of France, the Tajo of Spain, and other noble streams! The numerous tributary rivers, from the Alps and Appenines, bring down so much sand and gravel that the bed of the Po has in modern times been considerably raised, so that in many places banks of thirty feet in height are necessary to preserve the country from inundation. Hence hydraulics have been much studied in the north of Italy; and the numerous canals of irrigation delight and instruct the traveller. Perhaps by deepening the chief estuary, and bed of the river, equal service might

* Any pernicous wind is in Italy called *sirocco*, in the south applied to the hot blasts from Africa, in the north to the bleak wind from the Alps.

have been rendered to commerce. In the middle ages maritime combats took place on the Po, between Venice and some of the inland powers. It is remarkable that, from Cremona to the sea, there is no capital city founded on the main stream of the Po: and the case was the same in ancient times; an exception to the supposition that every river has some grand city near its estuary*.

The other rivers of the north of Italy, as the Adige, the Brenta, the Piavi, and the Tagliamento, must now rather be regarded as Austrian streams.

ARNO. In the centre first appears the Arno, which rises in the Appenines, and flows by Florence and Pisa into the gulf of Genoa.

TIBER. The Tiber, an immortal stream, is by far the most considerable in the middle, or south of Italy, rising near the source of the Arno, south-east of St. Marino, and passing by Perugia, and Rome, to the Mediterranean, which it joins after a course of about 150 British miles. The Tiber is said to receive about forty-two rivers, or torrents, many of them celebrated in Roman history; as is the Rubicon, a diminutive stream, now the Fiumesino, which enters the Adriatic about eight British miles to the north of Rimini. In this central part of Italy many small streams flow from the Apennines both to the Mediterranean and Adriatic: but after the Tiber no river can be mentioned in this, or the southern division, whose course deserves the notice of general geography.

LAKES. Italy contains many beautiful lakes, particularly in the northern division.

LOCARNO. The Lago Maggiore, Greater Lake, or lake of Locarno, is about twenty-seven British miles in length, by three of medial breadth; and the shores abound with Alpine beauties, receiving the waters of some other lakes, among which must be mentioned that of Lugano on the east. This lake formerly adjoined to the Milanese territory, and contains the beautiful Boromean Isles, celebrated by many travellers. Still further to the east is the lake of Como, which is joined by that of Lecco: the lake of Como is about thirty-two British miles in length, but the medial breadth not above two and a half. Yet further to the east is the small lake of Iseo, which is followed by the noble Lago di Garda, an expanse of about thirty British miles in length by eight in breadth.

In the central part of Italy, the largest lakes are those of Perugia and Bolsena, with those to the north of Rieti. Some small lakes are also celebrated, as that of Albano, shaded by trees and rocks, and that of Nemi in the same vicinity, about seventeen miles south-east from Rome. In the Neapolitan part is the lake of Celano in the north; and that of Varano, near mont Gargano: nor is there any large lake in the southern part, or in the island of Sicily, in which last that of Beverio, near Lentini, is the most remarkable.

* To the north of Ferrara, the Po seems as broad as the Rhine at Dusseldorf, Stralberg, ii. 576: but is probably not above half as deep. Dr. Smith, ii. 360, compares the Po, near Ferrara, to the Maese at Rotterdam, and says it is nearly as wide.

MOUNTAINS. The most important mountains of Italy are the Alps, already in a great measure described, under the article of Swisserland.

ALPS. The maritime Alps rise from the sea to the west of Oneglia, and are succeeded by other denominations, extending due north to mont Blanc, the ancient boundary of Savoy, and now a French mountain*. The most remarkable passage through the maritime Alps is the Col de Tende. Few summits in this western chain have received particular denominations: the chief are mont Viso, which gives source to the Po; and mont Cenis a noted passage to Turin. Other names are mont Genevre, mont Iseran, Roch Michel†, &c. In general the western Alps rise, in successive elevation, from the sea to mont Blanc. Saussure has explained, with his usual ability, the composition of this chain of the Alps‡. The calcareous mountains near Geneva, are followed by granitic mixtures of mica and quartz, with argillaceous schistus, and serpentine. From mont Blanc the grand chain of the Italian Alps bends north-east, presenting the high summits of the great St. Bernard, and mont Maudit, Combin, Servin, and mont Rosa, the last nearly approaching mont Blanc itself in height. In his last volume, Saussure has given ample details concerning this vast mountain, which has remained unnoted in the maps, while a fictitious mont Moro has supplied its place. Mont Rosa forms, as it were, a circus of gigantic peaks, surrounding the village of Macugnaga, a singularity of form strongly contrasting with mont Blanc, and supposed to impart the name from some resemblance to an expanded rose‖. While mont Blanc, and the adjacent high summits, are composed of vertical strata, the most elevated peaks of mont Rosa are horizontal, or not inclined more than 30°. The structure is equally different; for while mont Blanc consists of vast masses of granite, mont Rosa is chiefly of gneiss, or schistose granite, and other slaty rocks. So various are the great operations of nature, where theory would expect similarity.

From mont Rosa, this grand chain continues its progress north-east, by Simplon, &c. through the country of the Grisons to the glaciers of Tyrol, terminating in the Salzian Alps. This chief chain, passing through the centre of Tyrol, ought indeed to form the boundary between Germany and Italy; for the Italian Alps, to the north of the former Milanese and Venetian territories, are of comparatively small elevation. Mont Baldo on the east of the lake di Garda, deserves to be mentioned, only on account of its botanical wealth, and literary

* The country of Nice has also been seized by the French, and styled the department of the maritime Alps; the highest chain of these Alps, through which is the Col de Tende, forming the exterior boundary of the country of Nice.

† Keysler, i. 202. idly asserts that the Roche Melon, near mont Cenis, is supposed to be the highest of the Italian Alps. It is 11,977 English feet above the sea; while Little mont Cenis is 9,956. Smith, iii. 138. Mont Rosa exceeds 15,500. Mont Blanc by Sir G. Shuckborough, 15,662; by De Luc, 15,304.

‡ Voyage, tome v.

‖ Saussure, viii. 54.

celebrity; the highest by far of the Italian Alps belonging to the country of Piedmont.

Appenines. The next grand chain of Italian mountains is that of the Appenines. While the western Alps branch off on one side into the mountains of Dauphiné*, on the other the Appenines are at first a branch of the Alps, which separates the plains of Piedmont from the sea†. Thus the Appenines being near Ormea, in that high ridge which now forms the boundary of the French department of the maritime Alps, and stretch without any interruption along both sides of the gulf of Genoa, at no great distance from the sea, giving source to many rivers flowing to the north and to the east. In the south of the former territory of Modena, after giving rise to the Panaro, and Reno, they proceed almost due east to the centre of Italy, where they afford sources to the Arno, and the Tiber, and thence pass south-east to the extremities of Italy, generally approaching nearer to the Adriatic than to the Mediterranean. The noted mount Gargano is, as it were, a spur of the Appenines to the north of the gulf of Manfredonia. In general, the Appenines may rather be regarded as hills than as mountains. Ferber‡ found them to consist, to the south of Bologna, of stratified grey hard lime-stone, with a few petrifactions. Yet in the Genoese territory, and Tuscany, appear not only the beautiful marble of Carrara, but rich serpentine, here called Gabbro, with steatite and asbestos. What is called granite stone is also found, consisting of white felspar and green mica‖. The territory of Sienna presents some granitic hills, with slate, serpentine, and the noted yellow marble with black veins, found at Montarenti, and many metallic ores; this district being after Piedmont, perhaps the richest mineral region in Italy; but the hills seem rather distinct than connected with the Appenine ridge, from which they are divided by the Chiano, and the Tiber, the most noted of the Siennese hills being Monte Pulciano.

Volcanos. Having thus briefly considered the chief ridges Italian mountains, those sublime features of the country, the volcanos must not be omitted. They only occur in the southern division, and have recently received scientific illustration from the able and accurate pen of Spallanzani.

Vesuvius. Vesuvius is a conic detached mountain, about 3,600 feet high, but seems chiefly calcareous, like the Appenines, as it frequently ejects marble, calcareous spar, gypsum, and similar substances**. The lava, as usual, is generally with a basis of hornblende; a substance which consists in a great degree of iron, is liable to easy fusion with sulphur: and it is sometimes mingled with felspar, quartz, or granite, seemingly ejected from great depths. The terrors of an eruption, the subterranean thunders, the thickening smoke, the ruddy flames, the stony showers ejected to a prodigious height, amidst the corruscations of native lightning, the throes of the mountain, the eruption of the lava, descending in a horrid and copious stream of destruc-

* Some would extend this chain to the Pyrennees; but a great and accurate observer remarks, that it is entirely interrupted by the wide plains of Lower Provence, and Languedoc. Saussure, v. 222.

† Saussure, v. 221.

‡ Italy, 76. ‖ Ib. 250. **Ferber, 139.

tion, have exercised the powers of many writers, but far exceed the utmost energy of description.

ETNA. Yet Vesuvius, placed by the side of Etna, would seem a small ejected hill, the whole circuit of its base not exceeding thirty miles, while Etna covers a space of 180, and its height above the sea is computed at about 11,000 feet*. This enormous mass is surrounded by smaller mountains, some of which equal Vesuvius in size; and while the lava of the latter may devolve its stream for seven miles, Etna will emit a liquid fire thirty miles in length. The crater of Vesuvius never exceeds half a mile in circumference, while that of Etna is commonly three, and sometimes six miles. Spallanzani has minutely described the crater of Etna, which many travellers have pretended to visit. It was an oval, extending from east to west, enclosed by vast fragments of lava and scoriæ; the inner sides being of various declinations, incrusted with orange-coloured concretions of muriat of ammoniac. The bottom was a plain nearly horizontal, about two thirds of a mile in circumference, with a large circular aperture, giving vent to a column of white smoke, at the bottom of which was visible a liquid fiery matter, like metal, boiling in a furnace. Such is the height of Etna, that the eruptions rarely attain the summit, but more usually break out at the sides. Near the crater begins the region of perpetual snow and ice; which is followed by the woody region;† vast forests of oaks, beeches, firs, and pines, whilst the upper is almost destitute of vegetation. In this middle region also appear chesnut trees of enormous size; one in particular distinguished by the name *di Cento Cavalli*, the circumference of which has been found to be 204 feet, an amazing phenomenon of vegetation. Dolomieu has published a minute catalogue of all the mineral products of Etna: the lavas being mostly with a basis of hornblende, while many others are of petrosilex, or the keralite of the French: the ejected stones are granitic, or calcareous. Dolomieu asserts, that Etna may be said to be surrounded with columns of basalt which he calls prismatic lava; but Spallanzani‡ observes, that he has carefully examined the shore, which is volcanic for near twenty-three miles, "one-third of it beginning at Catania, and proceeding to Castello di Jaci, consists of prisms more or less characterized, and such as they have been described by M. Dolomieu: but the other two-thirds, though equally composed of lavas with the former, and for the most part falling perpendicularly into the sea, have no such figure; and only present here and there irregular fissures, and angular pieces, such as are generally observable in all lavas, which separate more or less on their congelation‖."

* Spallanzani, i. 195.

† The ruined turret called the Tower of the Philosopher, is well conjectured by M. de Non, p. 67, to have been erected on occasion of the emperor Hadrian's visit to Etna.

Mr. Kirwan, Geog. Ess. 268, says, that the lavas of Etna are mostly porphyrytic, whence he argues that the basis is porphyry. But these lavas (Dolomieu, 212) are of hornblende, with crystals of felspar, so that it would be more just to infer that the basis is iron ore.

‡ iii. 204.

‖ Spallanzani is of opinion that basalt is sometimes formed by fire, and sometimes by water. Other substances also assume the prismatic form, as

Stromboli. The islands of Lipari, to the north of Sicily, also contain many volcanos, of which Stromboli is the chief. This crater is distinguished from any other by constant momentary eruptions of showers of stones, which, from its position in the side of the hill, are confined, and relapse into the volcano, thus supplying endless materials*. The isle called Vulcano, presents a most capacious crater; but the materials of eruption seem exhausted. The lava has a base of petrosilex; and Spallanzani here found small prisms of basalt, about a foot in length†. The isle of Lipari, containing the town so called, presents vast rocks of volcanic glass; and the hill called Campo Bianco, three miles from the town of Lipari, contains almost all the pumices which are employed for various purposes in Europe. Felicuda, and Alicuda, the two extreme Liparian islands towards the west, also display proofs of their having anciently contained volcanos: and recent authors have discovered similar proofs in the isle of Ischia, and in those of Ponza‡, to the north of the gulf of Naples; while that of Capri, to the south of that gulf, is supposed to be chiefly calcareous.

Forests. There are still some remains of forests in some parts of the Appenines; but the early civilization of Italy seems to have been disadvantageous to the growth of timber. The woods of mount Gargano are celebrated by the ancient classics, and the forests of Etna appear to be extensive.

Botany. It is probable that the botanic treasures of Italy are at least equal to those of any other European country, on account of the great variety of its soil, the irregularity of its surface, and the genial benignity of its climate: excepting however Piedmont, which has been ably surveyed by Allioni, the rest of this fine country, especially its southern provinces, has by no means received that degree of notice which it merits: the vale of Enna, the forests of Apulia, the romantic scenes of Calabria, and the warm shore of the Tarentine bay contain a rich harvest for future naturalists, and will, no doubt, grace the flora of Italy with many new species.

The alpine barrier of the north of Italy, and the long range of the Appenines present a number of plants, inhabitants of the highest mountains, which have already been enumerated in the botany of Swisserland, such are rhododendron ferrugincum, azalea procumbens, bartsia alpina, pedicularis incarnata, soldanella alpina, androsace maxima, carnea, and villosa, primula vitaliana, auricula, and hirsuta, gentiana nivalis, atragene alpina, draba aizoides, and pyrennaica, campanula cenisia, and papaver alpinum.

The western coast has been perhaps the best explored, and has in consequence been found to be profuse of beauties: the stately *tree-heath*, erica arborea, with the two elegant shrubby euphorbias, E. dendroides, and spinosa, the evergreen arbutus unedo, and the *tamarisk*, tamarix gallica, mantle over the summits of the cliffs, or bend mid-

the columns of red jasper near Dunbar, in Scotland. Some ores of iron also affect it; and the other substances are strongly impregnated with that metal, which seems the real and radical cause of that crystallization.

* Spallanzani, ii 52. † Ib. ii. 260—5, &c.

‡ See Dolomieu sur les isles Ponces, et catalogue raisonné des produits de l'Etna. Paris 1788. 8vo.

way, from them towards the sea: the dryer rocks, and of a more scanty soil, are crowned with the *great aloe*, agave americana, while their sides are adorned with the *Indian fig*, cactus opuntia. The stony beach, and the sandy recesses of the bays delight the eye with the snowy blossoms of the *caper bush*, capparis spinosa, and the glow of the *amethystine eryngo*, with the *lavender*, lavandula spica, and stæchas, the *rosemary*, rosmarinus officinalis; the glaucous foliage of the strong scented *rue*, the *tree southern-wood*, artemisia arborescens, the hyacinthus serotinus, anthyllis barba Jovis, plumbago europæa, dianthus carthusianorum, ambrosia maritima, lavatera arborea, clypeola maritima, and pancratium maritimum.

The sides of the streams are bordered by the spiræa hypericifo the *oleander*, the *myrtle*, the *Cornelian cherry*, cornus mascula, and the *Spanish reed*, arundo donax, whose tall jointed stem, and long simple leaves almost emulate the bamboo of India.

The dry heathy tracts of the interior of the country are covered with erica scoparia, and carnea, ruta montana, cistus laurifolius, and ladaniferus. Rhus coriaria, *sumach;* rosa cinnamomea, *cinnamon rose;* salvia officinalis, and æthiopis, *sage;* melissa cretica, convolvulus cneorum, catananche cærulea, and passerina hirsuta.

Among the trees, besides the common ones of Britain, we find the *olive*, the *date plum*, diospyros lotos, the *storax tree*, styrax officinalis. Melia azedarach, the *bead tree*, the *almond*, the *pomegranate*, the *azarole plum*, the *pyracantha*, the *carob tree*, ceratonia siliqua, the ilex, the *pistachia*, the *manna-tree*, fraxinus ornus, the *cypress*, the *date palm*, the *lemon*, the *orange*, the *fig*, and the *vine*.

Of the flowering shrubs, and lower trees, the principal are the *lilac*, syringa vulgaris; the *jasmine*, and *yellow jasmine;* the *syringa*, Philadelphus coronarius, the *laburnum*, and cytisus argenteus; the *Spanish broom*, the *Judas tree*, cercis siliquastrum; the *bean trefoil*, anagyris fetida; the *provence rose*, rosa gallica; the *laurustinus*, the *bay*, the *laurel*, and globularia alypum.

The sublime ruins of ancient art, and the insulated rocks that often serve them for a base, afford a favourite situation for the *red valerian*, valeriana rubra, antirrhinum cymbalaria, majus, and orontium, cneorum tricoccum, cotyledon umbilicus-veneris, and coronilla glauca.

In the southern parts *cotton*, *rice*, and the *sugar cane* indicate the fertility of the soil, and the warmth of the climate; and the fields, and pastures, as far as they have been examined, bear a striking resemblance in their native products to those which have been already mentioned, as enlivening the southern provinces of Spain.

Zoology. The Italian horses are of little reputation. The cows of the Lodizan, where the noted cheese is now made, which was formerly produced near Parma, are described by Mr. Young as generally of a blood red colour, long, lank, and ill made*. The same writer observes, that though in Tuscany the number of cattle be far inferior to what might be expected, yet the art of fattening oxen is well understood. The buffalo is in Europe almost peculiar to Italy; an animal, though tame, of ferocious aspect, and as different from the bull, as

* France ii. 191.

the ass is from the horse. In manners he somewhat resembles the hog, being fond of wallowing in mud, his flesh is coarse, and his hide, though light, is so firm as to have supplied the buff coats, or armour of the seventeenth century. Originally, it is supposed from Africa, he is little adaped to any cold climate. The marmot, and the ibex, are also reckoned among the animals of the Appenines; and the crested porcupine is esteemed peculiar to the south of Italy. Among birds may be mentioned the little falcon of Malta, the certhia muraria, and the turdus roseus, and cyanus, with the alauda spinoletta, and other sorts of land and water fowl. Of reptiles, the lacerta orbicularis is esteemed peculiar to the kingdom of Naples. The remaining topics are treated under each division.

CHAPTER II.

THE SOUTHERN PART OF ITALY.

NAPLES AND SICILY, WITH THE ADJACENT ISLES.

NAPLES AND SICILY. THIS division comprises the kingdom of Naples and Sicily; being divided from the central part chiefly by an arbitrary line; nor has nature indeed marked any precise distinction, except some rivers were assumed as boundaries, towards the Mediterranean and Adriatic. Sicily is about 170 British miles in length, by seventy of medial breadth: while this part of Italy exceeds 300 miles in length by 100 in breadth. Square miles, 29,824, with six millions of inhabitants.

After the fall of the Roman empire, this part of Italy underwent various revolutions. The powerful princes of Benevento survived the conquest of the north of Italy by Charlemagne; and with other potentates in this quarter acknowledged the supremacy of the Greek empire, from which Sicily had been wrested, A. D. 828, by the Saracens, who possessed it till A. D. 1068.* A pilgrimage to St. Michael of mount Gargano, induced the Normans to attempt the conquest, which was gradually accomplished, both Saracens and Greeks being expelled.

HISTORICAL EPOCHS. The Norman leaders became dukes of Apulia, Calabria, and Sicily: and Roger was named king of Sicily by the Pope, A. D. 1130. The Norman line continued till their kingdom was subdued by Henry VI, emperor of Germany. After internal contests, Charles of Anjou became king of Sicily, 1266: after the Sicilian vespers, 1282, Sicily was seized by a fleet sent by the kings of Arragon, but Naples continued to acknowledge the line of Anjou, which expired in the infamous Jean, 1382. René of Anjou, king of Naples, 1435, was the father of Margaret, wife of Henry VI, of England: but the French line failed in 1481, in Charles Count de Maine, who named Louis XI, king of France, his heir, whence the pretension of France to the kingdom of Naples. The Spanish line of Naples and Sicily continued till 1714, when they passed to the house of Austria; but were transferred to that of Bourbon, 1736, in the person of Don Carlos, duke

* Sardinia was subdued about the same time, and was regained by the Pisans and Genoese in the year 1016.

To enumerate the antiquities of the Sicilian kingdom would be infinite, as besides those of Herculaneum, there are innumerable remains of Grecian architecture in the south of Italy, and in Sicily, particularly the grand temple near Girgenti.

of Parma and Placentia, son of Philip V, king of Spain, and of Elizabeth of Parma: who, succeeding to the crown of Spain, 1759, he conferred his Italian kingdom on Don Ferdinand, his third son, who married the sister of the emperor of Germany in 1768.

RELIGION. Though the religion be the Roman Catholic, the inquisition has been carefully excluded. Few men of distinguished genius have recently appeared in this portion of Italy, which is overrun with priests and lawyers: but among the latter Giannone has distinguished himself by his spirited history of his country. There are no less than twenty archbishopricks, and 125 episcopal sees; but no university of any reputation. The ecclesiastics are computed at 200,000; and it is supposed that about one half of the lands is in their possession. The government is nearly despotic. The laws are contained in the Codex Carolinus, published in 1754. The political importance is inconsiderable: but the French have never, without great loss, penetrated far into Italy, and it is probable that experience will teach them to abstain in future. The chief city is Naples, esteemed, after Constantinople, the most beautiful capital in the world: the inhabitants are computed at 380,000*. Palermo in Sicily, is supposed to contain 130,000. Messina was nearly destroyed by an earthquake, 1783; but Bari is said to contain 30,000 souls, and Catanea 26,000. Besides excellent wines, oranges, olives, rice, and flax, this kingdom abounds in cattle; and some parts are celebrated for the produce of manna and saffron†. The manufactures, particularly those of silk and woolen, date from the reign of Ferdinand I, of Arragon; and these, with the native products, constitute the chief articles of trade. Sicily is thought to be the native country of the sugar cane, indigenous however in the East and West Indies. The papyrus is also found in Sicily, perhaps transferred from Egypt. The mines are few and inconsiderable, as may be expected in a volcanic country: the chief are near Fiume di Nisi, in Sicily, where there are mines of antimony; and specimens are found of gold, lead, silver, and copper‡. Iron manufactures have been recently instituted near Naples, but the mines and the agriculture are alike neglected; and Sicily, anciently so fertile in grain, is now of little account. The revenue is computed at 1,400,000*l.* sterling; and the army at 40,000. There are about four ships of the line and four frigates.

MOUNTAINS. The mountains have been already mentioned in the general description of Italy, consisting chiefly of the Appenines, which branch out through Apulia to Otranto, and through Calabria to Cape Spartivento‖.

* Amalsi, about thirty miles south-east of Naples, was formerly a celebrated city and seaport, remarkable for the supposed invention of the mariner's compass, and for the discovery of the pandects of Justinian, A. D. 1137.

† The tillage is said to be excellent, Stolberg, i. 459; yet the same author observes, that the southern provinces are wholly neglected.

‡ De Non, 402.

‖ But these branches are very low, according to Stolberg. The same author, ii. 131, gives a curious representation of the stone hovels near Trani, on the northern shore of Apulia, which greatly resemble what are called the Picts' houses in Scotland.

RIVERS. The rivers are inconsiderable, being chiefly the Garigliano, which, under the name of Liri, may be traced from near the lake of Celano, to the gulf of Gaeta; and with the river that flows to Pescara, and that lake, might afford a natural boundary to the north, were a new division of Italy to happen. The Volturno passes by Capua, while the Sangro from an adjoining source, runs to the Adriatic. The others are rather rivulets; nor can those of Sicily aspire to a higher appellation, the chief of the latter being the Himera, or Salso, running to the south. The natural curiosities of these regions are numerous and interesting, independent of the grand volcanic appearances. About six miles from Girgenti, and very remote from Etna, there is a singular volcano, which, in 1777 darted forth a high column of potters' earth, of which there are continual ebullitions from about sixty small apertures*. The papyrus is only found in the Nile, and in the fountain of Cyane, which flows into the river Anapus near Syracuse.

SCYLLA. Spallanzani has explained the noted wonders of Scylla and Charybdis; the former being a lofty rock on the Calabrian shore, with some caverns at the bottom, which, by the agitation of the waves, emits sounds resembling the barking of dogs. The only danger is when the current and winds are in opposition, so that vessels are impelled towards the rock.

CHARYBDIS. Charybdis is not a whirlpool, or involving vortex, but a spot where the waves are greatly agitated by pointed rocks, and the depth does not exceed 500 feet. The isles of Lipari contain many natural curiosities, as the rocks of volcanic glass, and the spacious cavern in Felicuda called the Grotto of the Sea Ox, which, from an aperture forty feet high, opens into a hall near 200 feet long, 120 broad, and sixty-five high†. This cavern is in lava, and only accessible by sea; and our author supposes that it was occasioned by the action of the gases in the lava, when fluid; as there are examples in Etna of caverns far more deep, produced by a similar cause. The stoves, or warm caves of Lipari have suffered by neglect.

ISLES. The small isles off the gulf of Gaeta, also present singular features. While Capri, the Caprea of antiquity, and scene of the debaucheries of Tiberius, is calcareous, and seems merely an elongation of the adjoining promontory; the isle of Ischia, to the north, abounds with volcanic substances‡. Dolomieu has ably described the isles of Ponza, which, he observes, are inaccurately laid down in the maps, which present isles that do not exist, and omit others.

PENDATARIA. About thirty miles to the north of Ischia, and fifty from the Italian shore, is Pendataria, famous for the exile of Julia, the daughter of Augustus, now called Ventotiene, with the small isle of San Stefano to the east. The three other Ponzian isles are about twenty miles to the north-west of these two.

PONZA. Ponza, the largest, is in the middle; a narrow isle, extending from north-east to south-west, in length about four miles. Palmarola is about four miles to the west of Ponza, length from north

* De Non, 240. † Spallanzani, iii. 99.

‡ Ferber Italy, 178. See a description of this isle by Addison in his remarks on Italy. On the opposite shores is found that remarkable stone which, when watered produces mushrooms.

to south about three miles, and very narrow. Zanone is about four miles to the north-east of Ponza, in breadth and length about one mile. In the Adriatic sea, not far from mont Gargano, are the small isles of Tremeti, the Diomedeæ of antiquity. Sicily being an important part of the kingdom has been already considered. To the north of this great isle, and at a considerable distance from those of Lipari, is the small isle of Ustica, and at a still greater distance from the south Pantalaria. The isles of Malta and Gozo are of far more consequence, but have been so frequently described, that the theme is trivial. These isles are rocky and barren, not producing grain sufficient for half the consumpt of a thin population; but might, in the hands of the English, prove a valuable acquisition. Malta is about fifty British miles in circumference, and is supposed to contain 60,000 inhabitants. The isle of Gozo is about half the extent, and is rather fertile, the population being computed at 3,000.

CHAPTER III.

THE CENTRAL PART OF ITALY.

DOMINIONS OF THE CHURCH.—TUSCANY.—LUCCA.—ST. MARINO.—PIOMBINO, AND THE ISLE OF ELBA.

THIS portion comprehends the dominions of the Church, and the grand duchy, now kingdom, of Tuscany; with a few diminutive states, as the republics of Lucca and St. Marino, the principality of Piombino, and the small portion of territory around Orbitello belonging to the kingdom of Naples.

DOMINIONS OF THE CHURCH. The territory belonging to the Pope is the chief in extent, reaching from the Po to beyond the Terracina, a length of more than 250 British miles: but, on 13,808 square miles, contains little more than two millions of inhabitants.

PROGRESSIVE GEOGRAPHY. The secular power of the Popes dates from the age of Charlemagne, and the forged collection of papal rescripts, published in the ninth century under the name of Isidorus, led to successive accumulations of dominion. The small territory granted in the eighth century, was increased by the acquisition of Benevento in the eleventh; after which there was a pause: and the Popes themselves were constrained to reside at Avignon. Hence Dante and Petrarca satirized Rome, not because it was papal, as our reformers conceived, but because it was in opposition to the Popes. In 1513 Bologna was acquired by Julius II: the marquisate of Ancona followed in 1532: Ferrara 1598: Urbino 1626. The Pontiff is elected by the cardinals, a kind of chapter consisting nominally of priests and deacons, but in effect, of opulent ecclesiastics, who are elevated to this dignity, by their services to the church, by family connexions, or by princely recommendation. The nature of the papal power, is a bar to industry; and the Popes rarely attempt to restore the country to its former fertility, though Pius VI made ineffectual efforts to drain the Pontine marshes*. Almost the only exports from the papal states are a superior kind of alum, prepared from a whitish argillaceous rock at Tolfa near Civita Vecchia; from which place also puzzolana is exported, being a yellowish brown

* Count Stolberg allows that the eastern provinces of Urbino, Romagna, and the march of Ancona, are in a high state of cultivation and prosperity Travels, i. 459. See also Dr. Smith's praise of the country round Loretto, i. 103.

ashes, containing particles of iron, whence it forms a strong cement, which might be imitated by mixing filings of iron with mortar*.

Rome. Rome is supposed to contain 162,800 inhabitants: Bologna (famous for an ancient university) 80,000: and Ancona 20,000. The revenue arising from the papal territory was computed at about 350,000*l.* sterling; but, by exactions in foreign countries was raised to about 800,000*l.* Yet there was a large debt bearing eight per cent. interest, a sure proof of the want of industry and prosperity. The papal power seems now to be supported only by the influence of Austria.

Rivers. The chief river, as already mentioned, is the Tiber, which, running from north to south, pervades so great a part of the centre of Italy, that this portion might be named Italia Teverina; the southern Italia Volcanica; and the northern Italia Paduana, from the river Po. The rivers flowing into the Tiber are the Chiano from the west; and the Nera from the east, which receives the Velino from the south: not far to the north of Rome, the Teverone joins the Tiber, more noted for beautiful cascades near Tivoli than for the length of its course. The Velino displays a noble cascade of about 300 feet near Terni.

Tuscany. The grand duchy, now kingdom of Tuscany, has long been celebrated for the arts; and Florence is regarded as the Athens of modern Italy.

Extent. This principality is about 120 British miles in length, by ninety in breadth; but on 7,040 square miles contains a population of about 1,250,000.

Historical Epochs. Florence long continued a discordant republic, till the house of Medici, originally opulent merchants, obtained the supreme power in the beginning of the fifteenth century. That family becoming extinct, 1737, was followed by Francis duke of Lorrain, who afterwards succeeded to the house of Austria in the Imperial throne. Francis was followed by his son Peter Leopold, emperor in 1790; whose son Francis, became Grand Duke, and succeeded his father as emperor of Germany in 1792; his brother Ferdinand being appointed Grand Duke of Tuscany†. The revenue is computed at half a million sterling, but the forces do not exceed six or eight thousand. Tuscany is one of the most beautiful and fertile regions of Italy, with a temperate and healthy climate. It abounds in corn and cattle, and produces excellent wines and fruit. Florence contains about 80,000 inhabitants, and Livorno (corrupted by our mariners to Leghorn) 45,000: the latter, a celebrated port, has supplanted the maritime city of Pisa, now reduced to a population of about 20,000. The manufactures of silk and velvet were formerly celebrated, and still maintain reputation. The mountains in the Siennese, or southern part of Tuscany, contain valuable ores of antimony, copper which is wrought at Massa,

* Near Ancona are found large stones, containing, what are called sea-dates, a delicate species of shell fish. Keysler, iv. 41. They are also found in the south of France.

† It is now a kingdom under the protection of France, assigned to a prince of Spain.

and other metals, with slate and yellow marble. The serpentine of Impruneta, seven miles south from Florence, presents beautiful varieties used in ornamental architecture*. The Florentine marble is remarkable for picturesque representations of ruins, &c. caused by the infiltration of iron between the laminæ. The Arno receives many small streams; and the Ombrone is a considerable river which pervades the Siennese.

Lucca. The small republic of Lucca is supposed to contain 120,000 people, on 288 square miles; of which Lucca holds about 40,000. It assumed independence in 1370, the present aristocratic constitution was ratified in 1430; but in the recent revolutions of Italy, this state adopted a constitution similar to the French. The Luccanese are the most industrious people of Italy, and no spot of ground is neglected, the hills being covered with vines, olives, chesnut, and mulberry trees, while the meadows near the coast nourish numerous cattle. Oil and silk are the chief exports of Lucca, and their motto is Libertas, a goddess rarely found more amiable than here†.

St. Marino. The diminutive republic of St. Marino has been celebrated by many able writers. The inhabitants of the village and mountain are computed at 5,000. It is surrounded by the dominions of the Pope, and claims his protection. A hermit of the fifth century gave name and existence to this village, which grew up, unmolested, on the holy ground. In 1739 the miserable ambition of cardinal Alberoni, being disappointed in embroiling large states, was directed against this small republic, which he subjected to Rome, but the revenue being inconsiderable its ancient privileges were restored.

Piombino. The principality of Piombino, consisting of a small portion of the Italian shore, and the opposite isle of Elba, were in the thirteenth century, subject to the Pisans: and, after several revolutions passed to the family of Appiano, as a detached principality, in 1399. In 1501 it was siezed by Cæsar Borgia, but after the death of Pope Alexander VI, returned to the house of Appiano. In the the sixteenth century, the isle of Elba was repeatedly ravaged by the Turks. The principality recently passed to the house of Buoncompagni, that is the dukes of Sora, a Neapolitan family which owes its fortune to the Pontiff Gregory XII. Piombino is a small neglected town, the princes having generally resided at Rome.

* Ferber, 250, &c.

† Another small commercial republic, though situated on the eastern shore of the Adriatic, is often considered as an Italian state. Ragusa has a population of about 56,000, on 352 square miles. This state being adjacent to the territory, formerly belonging to the Venetians in Dalmatia, imitated the Venetian aristocracy, and was protected by the Turks, on condition of paying tribute. The religion is the Catholic, and the speech the Slavonic, but most of the inhabitants speak Italian. It is an archbishoprick, with six suffragans, and its commerce is considerable, as it supplies the Turks with several kinds of merchandise and ammunition. Ragusa is an ancient city, being the Rausium of the Romans, and in the tenth century had become a metropolis of Dalmatia. In the thirteenth century it was conquered by the Venetians, and afterwards subject, for a time, to the crown of Hungary. The history of Ragusa may be traced in that of Venice, and its manufactures are still of distinguished beauty. Lucii Dalmat. 49, &c. Busching, iii. 259.

Isle of Elba. The isle of Elba, the ancient Ilva, is about nine miles in length, and three in breadth; and has been remarkable from early antiquity, for its metallic productions, particularly beautiful ores of iron, often crystalized, and mingled with native Prussian blue. The chief iron mine is that of Rio, in the western part of the isle; but as there is no water it is wrought near Piombino. This remarkable isle is also said to contain copper, lead, and even tin. Magnet, by the Italians styled calamita, is also found in great perfection; but what is styled white calamita, seems to be a different substance. The coast of Campo contains granite, which, according to Ferber, is of a violet colour. Asbestos and amianthus are also among the productions of Elba. Ferber, himself a Swede, says that the iron ore of Elba is equal to that of Sweden. This isle produces excellent wine, some oil, and flax; but cannot boast of much fertility in grain*.

* Busching, xiii. 125. Ferber's Italy, 294. Tozzetti, in his travels through Tuscany, supposes Elba to have furnished most of the granite used by the Romans.

CHAPTER IV.

THE NORTHERN PART OF ITALY.

PIEDMONT.—MILAN.—MANTUA.—PARMA AND PLACENTIA.—MODENA.—GENOA.

THIS largest division formerly comprised the extensive territories subject to Venice, and the king of Sardinia, with Milan and Mantua appanages of the house of Austria, the principalities of Parma and Modena, and the long mountainous strip belonging to the Genoese. But the greater part of the Venetian possessions to the river Adige has become subject to Austria, and France has seized on Savoy with the county of Nice, and small principality of Monaco.

EXTENT. This part of Italy, therefore, is now about 200 miles in length, from the Adige to mont Blanc, and about 120 in breadth, from the gulf of Genoa to the Swiss frontier. This fertile region is, by the French, constituted a republic, under the name of Cisalpine, an erroneous application of the ancient name Cisalpine Gaul; as, on the contrary, the proper appellation, derived, with the projected government from France, ought to have been the Transalpine, or the Paduan republic, as the country is pervaded and fertilized by the Po*.

PIEDMONT. The most extensive province of this division is Piedmont, still about 150 English miles in length, by 100 of medial breadth. This principality was part of the ancient kingdom of Lombardy, and formed a part of the gradual acquisitions of the counts, afterwards dukes of Savoy, and latterly kings of Sardinia. While the revenue of Sardinia was estimated at 1,085,000*l.*, Piedmont contributed 953,750*l.*, Savoy 87,500*l.*, and Sardinia only 43,750*l.* This delightful province enjoys a mild and pure air, and distinguished fertility of soil, the plains producing wheat, maize, rice, with some olives and wine, and the pasturages abound with cattle. Mr. Young, says, in general, that the soil is a rich sandy loam, with some tracts of large gravel, brought down from the rivers; but the heat is excessive in summer, and the winter cold and very severe. Keysler mentions the fogs of autumn and winter, rising from the Po and other waters. Around Turin, and through a great part of the province, artificial irrigation, or the watering of meadows, is practised with great assiduity and

* Piedmont is excluded from this new republic; which, on the other hand, embraced the Papal territories of Ferrara, Bologna, and Romagna. The rest of Italy was once the Roman and Neapolitan republics.

success. The surrounding Alps are rich in minerals*. The *Alpine* chain, from St. Gothard to mont Cenis, is of prodigious height, particularly mons Rosa, a northern boundary of Piedmont, and supposed to be the ancient mont Sylvius; but from mont Cenis it becomes gradually lower, till the Appenines branch out between Roja and Livenza, enclosing this province on the south. Thus, numerous streams descend on all hands to fertilize the plains, and the river Orco forms at Ceresoli a vertical cascade, computed at 400 fathoms, or 2,400 feet. The torrent Evenson, descending from mont Rosa, forms about half a mile from Verrez, a fall of more than 200 fathoms. The copper mines in the duchy of Aosta are numerous; and in some places this metal is accompanied with antimony, arsenic, and zinc. In the superior regions near Macugnaga, there are mines of gold, found in marcasite and quartz: in the vale of Sesia are the gold mines of St. Maria, and Cavavecchia, also containing silver. Gold is likewise found in mountains of Challand, near the vale of Aosta; and the torrent Evenson rolls down pebbles of quartz, veined with that precious metal. Not far to the east of mont Blanc, a rich vein of cobalt has been recently discovered; and plumbago or black lead has been observed near the baths of Binay. But it would be infinite to detail the mineralogic opulence of Piedmont, which, spreading to the south of the highest Alps, almost rivals the southern side of the Carpathians in Hungary.

The chief city of Piedmont is Turin, supposed to contain more than 80,000 inhabitants, with an university founded in 1405 by Amadeo, duke of Savoy, this city having been subject to the family since A. D. 1097. Vercelli is said to contain 20,000; and Alessandria 12,000: a little to the east of the latter is Marengo, noted for a victory of Bonaparte over the Austrians. The king of Sardinia used to maintain an army of about 40,000. The chief exports consist of silk, which was chiefly manufactured at Lyons, some hemp, and large flocks of cattle†.

MILAN. Next in position, and now in consequence, is the fertile duchy of Milan, said to contain, on 2,432 square miles, a population of 1,116,850. The city of Milan was founded by the Gauls 584 years before the Christian era; and the inhabitants are computed at about 120,000. After the fall of the kingdom of Lombardy, it became subject to the emperors of the west; but, impatient of the yoke, it was severely punished by the emperor Frederic I, 1162; who taking it after a siege of seven months, destroyed the gates, ramparts, and edifices, except a few churches, and sowed salt on the ruins.

* See Memoire de M. Robilant sur la Minéralogie de Piémont. Journ. des Mines, No. 50.

† The island of Sardinia may be considered as an appendage of Piedmont. Mr. Young (France ii. 257,) informs us, seemingly from good authority, that this isle has been shamefully neglected by the government; for exclusive of the mountains, the whole country may be considered as waste and only cultivated in a few spots. The chief proprietors are absentees, and the peasantry crushed by rapacious stewards; the number of inhabitants about 450,000. The frequent wastes abound with wild ducks; but the number of cattle and sheep deplorably small, and the morasses produce most pernicious exhalations,

HISTORICAL EPOCHS. Recovering slowly, amid the contests between the emperors and the popes, it however could not assert the form of a republic, but became subject to the archbishop, and to the Torriani. Napoleon Torre, opposing Otto Visconti, archbishop of Milan, was defeated in 1277, and the prelate was proclaimed temporal lord of Milan. He was succeeded by his nephew; and the family of Visconti long possessed this opulent principality. In 1368, Yolande, daughter of Galeazzo was married to Lionel duke of Clarence son of the English monarch. This family expired in 1494; and was followed by Sforza, and by the French kings. In 1535 Charles V. seized Milan, as a fief of the empire, and gave it to his son Philip; whose successors, kings of Spain, held the Milanese till 1706, when it became an appanage of Austria; but a considerable part had passed to the house of Sardinia. The revenues of this duchy are computed at about 300,000*l.* At Pavia is an university of great repute, the professors having much distinguished themselves in natural history. It is regarded as the first in Italy. There are manufactures of wool and silk, but the latter is inferior to that of Piedmont: there are also numerous workmen in gold, silver, embroidery, steel, and in crystal, agate, aventurine, and other stones, so that the country swarms with artisans. Mr. Young* represents the soil as being chiefly strong loam, or loamy sand; and the most remarkable circumstance in the climate, is the mildness and warmth of the northern mountainous tracts, and the cold felt in the plains. Orange and lemon trees flourish in the open air, on the western side of the lake of Como, though bounded by the high Alps, which, to the north, are covered with eternal snow; while, in the plains of Lombardy, even to the Appenines, these trees require shelter. The Boromean isles also, in the Lago Maggiore, are covered with these delicate trees. In Parma severe frosts are felt, which are not unknown in Tuscany, and even at Rome. The lands in the Milanese, as in Piedmont, are mostly enclosed; and the farmers were metayers upon the old French plan, the landlord paying the taxes and repairs, the tenant providing cattle, implements, and seed; and the produce being divided between them; a miserable system which greatly impeded agriculture. The irrigation of the Milanese, Mr. Young represents as a stupendous effort of industry; and the canals for this purpose are mentioned as early as the eleventh century; some of them being more than thirty miles long, and near fifty feet wide. The price of land is near 100*l.* the acre, and yields about three per cent. interest. The cattle, dairies, and cheese, excellent; but the sheep, few and bad. Though the Milanese border, towards the north, on the higher Alps, and might thence be supposed to rival Piedmont, yet the mineralogy has been little explored, as the house of Austria possesses abundance of ancient and productive mines. Yet there are some mines of copper and lead above the lake of Como, and the mountains, and Boromean isles, present flesh-coloured granite. Lapis ollaris abounds near Como†.

MANTUA. The small duchy of Mantua was held by the house of Gonzaga, from the fourteenth century: but the last of the family being put to the ban of the empire, Mantua has been subject to

* France, ii. 148. † Ferber's Italy, 315.

Austria, since the year 1707, and was ruled by the governor-general of the Milanese. The capital stands on a lake formed by the Mincio, and was formerly supposed to contain 50,000 inhabitants, now reduced to about 12,000; the position and fortifications render it a place of great strength. The Venetian territory to the west of the Adige consisted chiefly of the Brescian and Bergamese, the latter being mountainous; but the Brescian is fertile in wine, oil, and maize, with excellent pasturages, and some mines of copper and iron.

PARMA AND PLACENTIA. The territories of Parma and Placentia have been conjoined for many ages. They were contested by the Lombards, and by the Exarchs of Ravenna; and, after many revolutions subjected themselves to the Papal see, whence they were transferred by Paul III, in favour of his son Pietro Farnese, in 1545. This family being extinct in 1731, after some contests, the duchies of Parma and Placentia were finally assigned to the Bourbon family of Spain. The population is computed at 300,000; revenue 175,000*l.* Parma is a considerable city, with some manufactures, and an academy of painting; the printing press established by Bodoni, was distinguished for beautiful productions. Both Parma and Placentia have universities. The soil is a rich sandy or gravelly loam, with fine pastures; and the Parmesan cheese now made at Lodi in the Milanese, has been celebrated for many centuries*. The farms are small, and agriculture ill conducted; irrigation being here little practised. The sheep are bad, and the wool like hair. The improvement of the country was much neglected by the Bourbon family.

MODENA. The duchy of Modena is a remnant of the power of the celebrated family of Este, who also possessed the adjacent country of Ferrara, seized by the Pope in 1598. The remaining territory contains 320,000 souls, and the city of Modena 30,000; the revenue 140,000*l.* The soil resembles that of the duchy of Parma; and the agriculture is little superior, the middle-men and metayers impeding industry, but some peasants in the mountains are proprietors of land. The breed of sheep is neglected.

NATURAL CURIOSITIES. It is remarkable, that in digging wells near Modena, at a certain depth, a particular stratum is found, which being passed, the water gushes up as from a subterranean lake or river. About ten miles to the south of the capital there is an aperture in the earth, called La Salza, whence, particularly in the spring and autumn, ascend smoke, flame, ashes, and stones, with a strong smell of sulphur. Carrara in the south of this duchy affords the celebrated marble used in statuary.

The imperial fiefs, and smaller states, in this part of Italy, would little merit description, especially in the midst of the present revolution.

GENOA. This account shall therefore close with the republic of Genoa, consisting of a long mountainous tract, formerly noted for the acuteness and treachery of the Ligurians, its inhabitants. The city

* Young's France, ii. 148. There are iron founderies near the Appenines. Keysler, iv. 113.

of *Genua* was destroyed by Mago the Carthaginian general, and rebuilt by the Romans.

Historical Epochs. It afterwards became subject to the Lombards, and the emperors of Germany; but in 806 had seized Corsica, and in the eleventh and twelfth centuries was distinguished in the crusades, the Genoese rendering themselves masters of the Black Sea, with establishments in the Crimea, and even in the suburb of Pera at Constantinople, where they remained till the Turks took that city*. Genoa strongly contested with Venice the dominion of the sea; and the war was not terminated till 1381. In 1471 the Genoese were expelled from the Crimea; but their maritime power continued respectable. The form of government was more democratic than that of Venice, so that the latter had a more firm executive effect. Exhausted by the Venetian war, Genoa offered voluntary subjection to France and Milan; but in 1528 Andrew Doria delivered his country, and introduced a more stable and aristocratic government, which continued till 1798, when the French form was chosen, and the new style assumed of the Ligurian republic, confirmed by the recent treaty of February 1801. In 1730 Corsica revolted from Genoa, and has not since been restored. In 1745 the Genoese declared war against the king of Sardinia, but suffered greatly in the contest. The papal power is here little venerated, the people being immersed in business, and receiving monied heretics with open arms. The population of the territory is computed at 400,000; of the city at 80,000. The troops including the country militia, may amount to 30,000; but the powerful fleets have sunk to a few gallies. The air is pure and salubrious, and there are excellent fruits and vegetables; but the grain is not sufficient for the consumption. The manufactures are chiefly of silk and velvet. The Appenines, which enclose this region, are in some places covered with forests, but in others are barren rocks, while in a few they afford delicious pasturage. They supply excellent marble for the proud palaces of Genoa; while Polzevera in the Bocchetta yields the beautiful stone so called, being serpentine of various colours veined with marble. In 1778 a magnificent road was made from the Bocchetta or mountains to the north of Genoa, through the Polzevera, which for the space of three years, employed from five to eight hundred men, by the patriotic munificence of one of the noble family of Cambiasi†.

This brief account of the northern division of Italy must not be closed without remarking, that the Cisalpine, or rather Transalpine or Paduan, republic, is re-established by the treaty of Luneville, 9th February 1801. By article XII. that republic is again acknowledged, as constituted by article VIII. of the treaty of Campo Formio‡.

* See Gibbon, xi. 390. † Stolberg, i. 215.

‡ This volume was written in the year 1800, and retouched in 1801. At present, May 1802, it may be proper to add, that the author has received from Paris, a map, recommended as accurate, by a learned professor at Milan, in which the boundaries of the Italian republic are distinctly marked. They extend to the utmost boundary of Romagna on the south-east, where they also border on the little republic of St. Marino; and, pursuing the northern limits of Tuscany and Lucca, embrace Modena, Carrara, and Massa; with Villa Franca, Ulla, and Fosdinovo (Imperial Fiefs). Thence the boundary

proceeds on the east of Parma, and north of Placentia, including the Lumelline; and, ascending the river Sesia, comprises the Val di Sesia. A new grand road has been opened by mont Simplon. The remaining north limit is chiefly that of the Milanese and Venetian Bergamesque; but with Chiavenna, the Valteline, and Bormio. The Trentin is left entire on the east, and the river Adige is followed from near Peri to its mouth, whence the Adriatic sea completes the line to the south of Romagna. Tortona, Voghera, and the Fiefs on the west of Parma, are not included in the demarcation. The Presidency of the Italian republic has been conferred on the illustrious Chief Consul Bonaparte.

The Pontiff Pius VII, (Chiaramonti, elected March 14th, 1800) retains the remainder of the territories of the church; and the Catholic system is declared predominant in France. The kingdom of Naples remains entire; and the history of Charles VIII. might have warned the French against any expedition into the south of Italy. The new kingdom of Tuscany has been already mentioned: (France is supposed to retain the isle of Elba.) The fate of Piedmont seems not finally determined, but it continues subject to France.

APPENDIX

TO

VOLUME FIRST.

No. I. TREATIES OF CAMPO FORMIO, 1797, AND OF LUNEVILLE, 1801.

†‡† These Treaties having introduced considerable alterations into European Geography, it was thought adviseable to subjoin them.

I. TREATY OF CAMPO FORMIO, WITH THE SECRET ARTICLES, 17 *October* 1797.

HIS majesty the emperor of the Romans, king of Hungary and Bohemia, and the French republic, being desirous to consolidate a peace, the basis of which was laid in the preliminaries signed at the castle of Eckenwald, near Leoben in Stiria, on the 18th of April 1797, (the 29th Germinal, 5th year of the French republic one and indivisible,) have named for their plenipotentiaries; viz. his majesty the emperor and king, the Sieur D. Martius Mastrily, and the noble Neapolitan patrician Marquis de Gallo, knight of the royal order of St. Januarius, gentleman of the bedchamber to his majesty the king of the two Sicilies, and his ambassador extraordinary at the court of Vienna; the Sieur Louis, count of the holy Roman empire, de Cobenzel, and great cross of the royal order of St. Stephen, chamberlain, privy counsellor of his said imperial and royal apostolic majesty, and his ambassador extraordinary to his imperial majesty of all the Russias; the Sieur Maximilian count de Meerveldt, knight of the Teutonic order, and of the military order of Maria Theresa, chamberlain and major general of the cavalry in the armies of his said majesty, the emperor and king; and the Sieur Ignatius baron de Degelmann, minister plenipotentiary of his said majesty to the Swiss republic....and the French republic, Buonaparte, commander in chief of the French army in Italy.

The aforesaid plenipotentiaries, after an exchange of their respective powers, have agreed upon the following articles:

ARTICLE I. There shall be hereafter a solid, perpetual, and inviolable peace, between his majesty the emperor of the Romans, king of Hungary

and Bohemia, his heirs and successors, and the French republic.

The contracting parties shall give the greatest possible attention to the maintaining between themselves and their respective dominions, the most perfect harmony, without hereafter permitting on either side any kind of hostilities to be committed, either by sea or land, for any cause or under any pretence whatever; and they shall carefully avoid for the future, any thing which might prejudice the union happily established. There shall not be granted any succour or protection, either directly or indirectly, to those who shall attempt any thing injurious or prejudicial against either of the contracting parties.

II. Immediately after the exchange of the ratifications of the present treaty, the contracting parties shall take off all sequestrations imposed on the effects, rights, and properties of individuals residing in the respective territories and countries that are united to them, and also of the public establishments situated therein; they bind themselves to pay all the debts they may have contracted, for pecuniary advances made to them by the said individuals, and public establishments, and to discharge or reimburse all the annuities settled to their advantage by each of the contracting parties. The present article is declared to extend to the Cisalpine republic.

III. His majesty the emperor, king of Hungary and Bohemia, renounces for himself and his successors, in favour of the French republic, all his rights and titles to the ci-devant *Austrian Netherlands*... The French republic shall enter on the perpetual possession of these countries, in full right and sovereignty, and on all the territorial possesions dependent thereon.

IV. All debts mortgaged before the war, on the land of the countries expressed in the preceding articles, and which mortgages shall have been drawn up with the usual formalities, shall be discharged by the French republic. The plenipotentiaries of his majesty the emperor, king of Hungary and Bohemia, shall transmit a statement of them, as soon as possible, to the plenipotentiary of the French republic, and previous to the exchange of the ratifications, to the end that, at the time of this exchange, the plenipotentiaries of both powers may come to an agreement upon all the explanatory and additional articles of the present treaty, and sign them.

V. His majesty the emperor, king of Hungary and Bohemia, consents that the French republic shall possess, in full sovereignty, the ci-devant *Venetian islands* of the Levant, viz. Corfou, Zante, Cephalonia, St. Maure, Cerigo, and other islands dependent thereon; together with Butrinto, Larta, Vouizza, and in general, all the ci-devant Venetian establishments in Albania, which are situate lower down than the gulf of Lodrino.

VI. The French republic consents that his majesty the emperor and king shall possess, in full sovereignty, the countries hereinafter mentioned, viz. *Istria*, *Dalmatia*, the ci-devant Venetian islands in the Adriatic, the mouths of the Castaro, the city of *Venice*, the Venetian canals; and the countries that lie between the hereditary states of his majesty the emperor and king, the Adriatic sea, and the line to be drawn from the Tyrol along the torrent before Gardola, stretching across the lake Garda as far as Lacisa; from thence a military line shall be drawn to Sangiacomo, holding out an equal advantage to both parties, which line shall be traced out by engineer officers appointed on either side, previous to the exchange of the ratifications of the present treaty. The line or limitation shall then pass the Adige to Sangiacomo, running along the left bank of that river to the mouth of the Canalblanc, comprising in it that part of Porto Legnago that lies on the right side of the Adige, together with a district of three thousand toises. The line shall be continued along the left bank of the Canalblanc, the left bank of the Tartaro, the left bank of the canal called Polisella, to where it empties itself into the Po, and along the left bank of the Great Po as far as the sea.

VII. His majesty the emperor, king of Hungary and Bohemia, renounces forever in his own name, and in that of his successors, &c., in favour of the *Cisalpine republic*, all the rights and titles arising from these rights, which his said majesty might pretend to have over these countries before the war, and which countries at present constitute a part of the Cisalpine republic; which republic shall possess them in

their full right and sovereignty, together with all their territorial dependencies.

VIII. His majesty the emperor, king of Hungary and Bohemia, acknowledges the *Cisalpine republic* as an independent power. *This republic comprises* the ci-devant Austrian Lombardy, the Bergamesque, the Brescian, the Cremonesque, part of the ci-devant Venetian states to the east and south of the Legner, described in the sixth article, as the frontier of the states of his majesty the emperor in Italy, the Modenese, the principality of Massa and Carrara, and the three legations of Bologna, Ferrara, and Romagna.

IX. In all countries ceded, acquired, or exchanged, in virtue of the present treaty, all sequestration imposed on the effects, rights and property, of individuals, belonging to these countries, shall be taken off; which individuals shall have been thus affected on account of the war that has subsisted between his imperial and royal majesty, and the French republic; nor shall they on this account be molested in their persons and property. Such persons as may hereafter be desirous to withdraw from the said countries shall be bound to make a declaration of such their intention, three months before the publication of the treaty or definitive peace: There shall be granted them the term of three months to enable them to sell their effects, either moveable or immoveable, and dispose of them in the manner they may judge most expedient.

X. The countries ceded, acquired, or exchanged, by virtue of the present treaty, shall leave the debts mortgaged on their territories, to be discharged by those under whose dominion they may fall.

XI. The navigation of such rivers and canals as mark the boundaries between the possessions of his majesty the emperor, king of Hungary and Bohemia, and those of the French republic, shall be free; without its being permitted to either of the powers to establish any toll or custom on them, or keep thereon any armed vessel, by which however is not precluded any precaution which may be thought necessary for the protection and safety of the fortress of Porto Legnago.

XII. All sales or alienations of property, all engagements entered into either by the cities or by the government, or by the civil administrative authorities of the ci-devant Venetian territories, for the maintenance of the German and French armies, up to the date of the signature of the present treaty, shall be confirmed and acknowledged as valid.

XIII. The territorial titles and archives of the different countries, ceded or exchanged by the present treaty, shall, within two months from the date of the exchange of the ratification, be put into the hands of the powers which have acquired the property of them. The plans and maps of the fortresses, towns, and countries, which the contracting parties acquire by the present treaty, shall be faithfully given up to them. The military papers and registers, taken in the present war from the etat-major of the respective armies, shall be restored in the same manner.

XIV. The two contracting parties, equally animated with the desire of removing every ground that might interrupt the good understanding happily established between them, mutually bind themselves, in the most solemn manner, to contribute, to the utmost of their power, to the maintenance of internal tranquillity in their respective states.

XV. There shall immediately be concluded a treaty of commerce, founded upon an equitable basis, and such as shall secure to his majesty the emperor, king of Hungary, and the French republic, advantages equal to those which the most favoured nations enjoy in their respective states. Meanwhile all communications, and commercial relations, shall be restored to the situation in which they stood before the war.

XVI. No inhabitant of all the countries occupied by the Austrian and French armies shall be prosecuted or questioned, either in his person or property, on account of his political opinions, or his conduct, civil, military, or commercial, during the war that has taken place between the two powers.

XVII. His majesty the emperor, king of Hungary and Bohemia, shall not, agreeably to the principles of neutrality, admit into any of his ports, during the course of the present war,

any vessels belonging to any of the belligerent powers.

XVIII. His majesty the emperor, king of Hungary and Bohemia, binds himself to cede to the *duke of Modena*, as an indemnification for the territory which that prince and his heirs possessed in Italy, the *Brisgaw*; which he shall possess upon the same conditions as those in virtue of which he possessed the Modenese.

XIX. The landed and personal property not alienated, belonging to their royal highnesses the archduke Charles, and the archduchess Christiana, which are situated in the countries ceded to the French republic, shall be restored, under the deduction of the expenses of sale, within three years. The same shall be done relative to the landed and personal property of his royal highness the archduke Ferdinand, in the territory of the Cisalpine republic.

XX. There shall be held a congress, solely composed of the plenipotentiaries of the Germanic empire and the French republic, for a pacification between the two powers. This congress, shall be opened a month after the signing of the present treaty, or as soon as possible.

XXI. All the prisoners of war made on either side, and the hostages given or carried away, during the present war, who have not yet been restored, shall be given back in forty days, dated from the day of the signing of the present treaty.

XXII The warlike contributions, deliveries, furnishings, and devastations of every kind, which have taken place in the respective states of the contracting powers, shall cease from the day on which the ratifications of the present treaty shall be exchanged.

XXIII. His majesty the emperor, king of Hungary and Bohemia, and the French republic, shall mutually preserve to each other the same ceremonial, with regard to rank and other etiquettes, which was constantly observed before the war. His said majesty and the Cisalpine republic shall observe, with regard to each other, the same ceremonial of etiquette which was in use between his majesty and the republic of Venice.

XXIV. The present treaty shall be ratified by the emperor, king of Hungary and Bohemia, and by the French republic, within thirty days from this day, or sooner if possible; and the instruments of ratification in due form shall be exchanged at Rastadt.

Done and signed at Campo Formio, near Udine, the 17th October, 1797, (26th Vendemiaire, sixth year of the French republic, one and indivisible.)

(Signed) BUONAPARTE.
MARQUIS DE GALLO.
LOUIS COUNT COBENTZEL.
COUNT DE MEERVELDT.
BARON DE DEGELMANN.

The executive directory ratifies and signs the present treaty of peace with his majesty the emperor, king of Hungary and Bohemia, negotiated in the name of the French republic by citizen Buonaparte, general in chief of the army of Italy, invested with powers by the executive directory, and charged with instructions to that effect.

Done in the national palace of the executive directory, 5th Brumaire, (October 26th,) sixth year of the French republic, one and indivisible.

This treaty was ratified by the council of five hundred on the 31st October; and by the council of elders two days after.

Secret Articles, and additional Convention, of the Treaty of Campo Formio, of the 26th Vendemiaire, 6th Year, (Oct. 17, 1797.)

ARTICLE I. His majesty the emperor, king of Hungary and Bohemia, consents that the boundaries of the French republic shall extend to the undermentioned line; and engages to use his influence that the French republic shall, by the peace to be concluded with the German empire, retain the same line as its boundary; namely, the *left bank of the Rhine*, from the confines of Swisserland below Basle, to the branching off of the Nette above Andernach, including the head of the bridge at Manheim, the town and

fortress of Mentz, and both banks of the Nette, from where it falls into the Rhine, to its source near Bruch. From thence the line passes by Kenscherade, and Borley, to Kerpen, and thence to Ludersdorf, Blantenheim, Marmagen, Coll, and Gemund, with all the circles and territory of these places along both banks of the Olff, to where it falls into the Roer, and along both banks of the Roer, including Heimbach, Nideggen, Durin, and Juliers, with their circles and territory; as also the places on the banks to Linnig included. Hence the line extends by Hoffern, and Kylensdalen, Papelernod, Lutersforst, Rodenberg, Haverstoo, Anderscheid, Kaldekuchen, Vampach, Herrigen, and Grosberg; including the town of Venloo and its territory. And if, notwithstanding the mediation of his imperial majesty, the German empire shall refuse to consent to the above-mentioned boundary-line of the republic, his imperial majesty hereby formally engages to furnish to the empire no more than his contingent, which shall not be employed in any fortified place; or it shall be considered as a rupture of the peace and friendship which are restored between his majesty and the republic.

II. His imperial majesty will employ his good offices, in the negotiation of the peace of the empire, to obtain, 1. That the *navigation of the Rhine* from Hunningen to the territory of Holland, shall be free, both to the French republic and the states of the empire, on the right bank: 2. That the possessors of territory near the mouth of the Moselle shall never, and on no pretence, attempt to interrupt the *free navigation* and passage of ships and other vessels, *from the Moselle* into the Rhine: 3. The French republic shall have the *free navigation of the Meuse;* and the tolls and other imposts, from Venloo to Holland, shall be abolished.

III. His imperial majesty *renounces*, for himself and his successors, the sovereignty and possession of *the county of Falkenstein* and its dependencies.

IV. The countries which his imperial majesty takes possession of, in consequence of the sixth article of the public definitive treaty this day signed, shall be considered as an indemnification for the territory given up by the seventh article of the public treaty, and the foregoing article. This renunciation shall only be in force when the troops of his imperial majesty shall have taken possession of the countries ceded by the said articles.

V. The French republic will employ its influence that his majesty the emperor shall receive the *archbishoprick of Salzburg*, and that part of the circle of *Bavaria* which lies between the archbishoprick of Salzburg, the river Inn, Salza, and Tyrol; including the town of Wasserburg on the right bank of the Inn, with an arrondissement of three thousand toises.

VI. His imperial majesty, at the conclusion of the peace with the empire, will give up to the French republic the sovereignty and possession of the *Fricktbal*, and all the territory belonging to the house of Austria on the *left bank of the Rhine*, between Zurgach and Basle, provided his majesty, at the conclusion of the said peace, receives a proportionate indemnification. The French republic, in consequence of particular arrangements to be made, shall unite the above-mentioned territory with the Helvetic republic, without farther interference on the part of his imperial majesty or the empire.

VII. The two contracting powers agree that when, in the ensuing peace with the German empire, the French republic shall make an acquisition in Germany, his imperial majesty shall receive an equivalent; and if his imperial majesty shall make such an acquisition, the French republic shall in like manner receive an equivalent.

VIII. The prince of Nassau Dietz, late *stadtholder* of Holland, shall receive a territorial indemnification; but neither in the vicinity of the Austrian possessions, nor in the vicinity of the Batavian republic.

IX. The French republic makes no difficulty to restore to the *king of Prussia* his possessions on the left bank of the Rhine. No new acquisition shall however be proposed for the king of Prussia. This the two contracting powers mutually guarantee.

X. Should the king of Prussia be willing to cede to the French and Batavian republics some small parts of his territory on the left bank of the Meuse, as Sevenger and other possessions towards the Yssel, his im-

perial majesty will use his influence that such cessions shall be accepted and made valid by the empire.

XI. His imperial majesty will not object to the manner in which the *imperial fiefs* have been disposed of by the French republic in favour of the Ligurian republic. His imperial majesty will use his influence, together with the French republic, that the German empire will renounce all feudal sovereignty over the countries which make a part of the Cisalpine and Ligurian republics, as also the imperial fiefs, such as Laniguiana, and those which lie between Tuscany and the states of Parma, the Ligurian and Lucchese republics, and the late territory of Modena: which fiefs make a part of the Cisalpine republic.

XII. His imperial majesty, and the French republic, will in concert employ their influence, in the course of concluding the peace of the empire, that the princes and states of the empire who, in consequence of the stipulations of the present treaty of peace, or in consequence of the treaty to be concluded with the empire, shall suffer any loss in territory or rights, (particularly the electors of Mentz, Treves, and Cologne, the elector palatine of Bavaria, the duke of Wirtemburg and Teck, the margrave of Baden, the duke of Deux Ponts, the landgraves of Hesse Cassel and Darmstadt, the princes of Nassau Saarbruck, Salm, Korburg, Lowenstein, Westheim, and Wied Runckel, and the count de Leyn,) shall receive proportionable indemnifications in Germany, which shall be settled by mutual agreement with the French republic.

XIII. The troops of his imperial majesty, twenty days after the ratifications of the present treaties, shall evacuate the towns and fortresses of Mentz, Ehrenbreitstein, Philipsburg, Manheim, Kunigstein, Ulm, and Ingoldstadt; as also the whole territory appertaining to the German empire, to the boundaries of the hereditary states.

XIV. The present secret articles shall have the same force, as if they were inserted word for word in the public treaty of peace this day signed; and shall, in like manner, be ratified at the same time by the two contracting powers; which ratifications shall be exchanged in due form at Rastadt.

Done and signed at Campo Formio, on the 17th October, 1797, (26th Vendemiaire, in the 6th year of the French republic, one and indivisible.

(Signed) BUONAPARTE.
MARQUIS DE GALLO.
LOUIS COUNT COBENTZEL.
COUNT MEERFELDT, Major-General.
COUNT DEGELMANN.

II. TREATY OF LUNEVILLE, 9 *Feb.* 1801.

HIS majesty the emperor, king of Hungary and Bohemia, and the first consul of the French republic, in the name of the French people, being equally desirous to put an end to the misfortunes of the war, have resolved to proceed to the conclusion of a definitive treaty of peace and friendship.

His said imperial and royal majesty, not being less ardently desirous to make the Germanic empire partake of the benefits of peace, and the present junctures not leaving time necessary for the empire being consulted, and being able to intervene deputies in the negotiation; and his said majesty considering besides what has been consented to by the deputation of the empire, in the preceding congress of Rastadt, has resolved, (as it has been done in similar circumstances,) to stipulate in the name of the Germanic body.

In consequence of which the contracting parties have appointed for their plenipotentiaries.....his imperial and royal majesty, the Sieur Louis count of the holy Roman empire, de Cobentzel, knight of the golden fleece, grand cross of the royal order of St. Stephen, and of the order of St. John of Jerusalem, chamberlain, actual privy counsellor of his said imperial and royal majesty, his minister of conferences, and the vice-chancellor of court and state; and the first consul of the French republic, in the name of the French people, citizen Joseph Buonaparte counsellor of State:

Who, after having exchanged their full powers, have determined on the following articles:

ARTICLE I. There shall be for the future, and forever, peace, friendship, and good intelligence, between his majesty the emperor, king of Hungary and Bohemia, stipulating as well in his name, as in the name of the Germanic empire, and the French republic; his said majesty pledging himself to make the said empire ratify, in good and due form, the present treaty. The greatest attention will be given on one part, and on the other, to the maintenance of a perfect harmony, and to prevent any kind of hostility, by land or by sea, for whatever cause, and under whatever pretence, by applying themselves with care to entertain the union happily re-established. No assistance and protection will be given, neither directly nor indirectly, to those who would prejudice one or the other of the contracting parties.

II. The *cession of the* ci-devant *Belgic provinces* to the French republic, stipulated by the third article of the treaty of Campo Formio, is here renewed in the most formal manner; so that his imperial and royal majesty, for himself and his successors, as well in his name, as in the name of the Germanic empire, renounces all his rights and titles to the aforesaid provinces, which shall be possessed forever, in full sovereignty and property, by the French republic, with all the territorial estates belonging to them.

There shall likewise be given up to the French republic, by his imperial and royal majesty, and with the formal consent of the empire.....

1st. The *county of Falkenstein*, with all its dependencies:

2dly. The *Frickthal*, and every thing which belongs to the house of Austria, on the *left bank of the Rhine*, between Zurzach and Basle; the French republic reserving to herself to yield this last country to the Helvetic republic.

III. In the same manner, in renewing and confirming the 6th article of the treaty of Campo Formio, his majesty the emperor and king, shall possess in full sovereignty and property the countries hereafter designated, to wit:.....*Istria*, *Dalmatia*, and the Venetian states of the Adriatic dependent thereon; the mouths of the Catara, the city of *Venice*, the marshes (les lagunes,) and the country comprized between the hereditary states of the emperor, the Adriatic sea, and the Adige, from its quitting Tyrol to its embouchure in the said sea, the *thalweg* of the Adige serving for a line of limitation: and as the adopting of this line will intersect the towns of Verona and Porto Legnago, drawbridges shall be established in the middle of them, in order to mark their separation.

IV. The eighteenth article of the treaty of Campo Formio is in like manner renewed, so far as obliges his majesty the emperor and king, to cede to the *duke of Modena*, as an indemnity for the country this prince and his heirs had in Italy, the *Brisgaw*, which he shall possess on the same conditions as those in virtue of which he possessed the Modenese.

V. It is also agreed, that his royal highness the grand duke of Tuscany renounces for himself, his successors and assigns, the *grand duchy of Tuscany*, and that part of the island of *Elba* which is dependent thereon, as well as all rights and titles resulting from the dominion of the said states; the same shall be possessed in full sovereignty and property by his royal highness the *infant duke of Parma*. The grand duke will obtain a full indemnity in Germany for the loss of his estates in Italy. The grand duke may dispose as he pleases of the estates and property which he particularly possesses in Tuscany, whether by personal acquisition, or by heirship of the personal acquisitions of the deceased emperor Leopold II, his father, or of the deceased emperor Francis I, his grandfather. It is also agreed, that the trusts, establishments, and other property of the grand duchy, as well as the debts from mortgages on the country, shall be transferred to the new grand duke.

VI. His majesty the emperor and king, as well in his own name as in that of the Germanic empire, consents that in future the French republic shall possess, in full sovereignty and property, the countries and domains situated on the *left bank of the Rhine*, and which made part of the German empire, in a manner conformable to

that which had been expressly consented to at the congress of Rastadt by the deputation of the empire, and approved by the emperor; the *thalweg* of the Rhine being hereafter the limit between the French republic and the German empire: to wit, from the place where the Rhine leaves the Helvetic territory, to that where it enters the Batavian territory. In consequence of which the French republic formally renounces every possession whatsoever on the right bank of the Rhine, and consents to restore to whomsoever they may belong, the places of Dusseldorff, Ehrenbreitstein, Philipsburg, the fort of Cassel, and other fortifications opposite Mayence on the right bank; as also the fort of Kehl and Old Brissac, upon the express conditions that those places and forts shall continue and remain in the same state as at their evacuation.

VII. And as in virtue of the cession which the empire makes to the French republic, several princes and states of the empire will be dispossessed, in the whole or in part, of what belonged to them, particularly; while collectively the German empire has to support the losses resulting from the stipulations of the present treaty; it is agreed between his majesty the emperor and king, as well in his own name as in that of the German empire, and the French republic, that, conformably to the principles laid down and established at the congress of Rastadt, the empire is bound to give to the hereditary princes so dispossessed on the left bank of the Rhine, an indemnification to be taken from the body of the empire, according to the arrangements which, after the said basis, will be ultimately determined upon.

VIII. Throughout all the ceded countries, acquired or exchanged by the present treaty, it is agreed upon, as it had been by the 4th and 10th articles of the treaty of Campo Formio, that those to whom they will belong take upon themselves the debts as mortgages upon the land of the said country; but in consideration of the difficulties which, in regard to this matter, the interpretation of the said articles in the treaty of Campo Formio gave rise to, it is expressly understood that the French republic only takes upon itself the debts arising from the loans formally consented to by the states of the ceded countries, or the expenses incurred by the effective administration of the said countries.

IX. Immediately after the exchange of the ratification of the present treaty, there shall be granted, in all the countries ceded, acquired, or exchanged by the said treaty, to all the inhabitants and proprietors whomsoever, an exemption from the sequestration put on their goods, effects, and revenues, on account of the war which has taken place. The contracting parties oblige themselves to discharge all they may owe for principal lent to them, by the said individuals, as well as by the public establishments of the said countries; and to pay or reimburse all the interest accruing to them by each of the said parties. In consequence of which it is expressly stipulated that the proprietors of stock of the bank of Vienna, become French, shall continue to enjoy the benefit of their stock, and receive the interest accrued or to accrue, notwithstanding any sequestration or forfeiture, which shall be considered as not having taken place; particularly the forfeiture resulting from the French proprietors not having furnished the thirty, and the cent per cent. demanded of the proprietors of stock of the bank of Vienna by his majesty the emperor and king.

X. The contracting parties shall reciprocally remove the sequestrations that have been put, in consequence of the war, on the goods, rights and revenues of the subjects of his majesty the emperor, or of the empire, in the territory of the French republic; and of the French citizens, in the states of his said majesty or of the empire.

XI. The present treaty of peace, particularly the articles 8, 9, 10, and the 15th hereinafter, are declared common to the Batavian, Helvetic, Cisalpine, and Ligurian republics. The contracting parties mutually guarantee the independence of the said republics; and the right of the people who inhabit them to adopt such form of government as they shall judge fit.

XII. His imperial and royal majesty renounces, for himself and his successors, in favour of the Cisalpine republic, all rights and titles accruing from those rights, which he might claim over those countries which he possessed before the war; and which,

under the terms of the 8th article of the treaty of Campo Formio, make a part of the Cisalpine republic, which shall possess them in full sovereignty and property, with all the territorial property depending on them.

XIII. His imperial and royal majesty, as well in his own name as in the name of the Germanic empire, confirms the adherence already given, by the treaty of Campo Formio, to the re-union of the heretofore imperial fiefs to the Ligurian republic; and renounces all rights and titles accruing from those rights over the said fiefs.

XIV. Conformably to the article of the treaty of Campo Formio the navigation of the Adige, serving as the limit between the states of his imperial and royal majesty, and those of the Cisalpine republic, shall be free; so that neither party shall establish thereon any toll, nor keep any armed vessels thereon.

XV. All the prisoners of war, taken on the one side and the other, as well as the hostages taken or given during the war, who have not yet been restored, shall be restored within forty days from the signature of the present treaty.

XVI. All the real and personal property of his royal highness the archduke Charles, not alienated, and of the heirs of her late royal highness the archduchess Christiana, situated in the countries ceded to the French republic, shall be restored to them on condition that the said property shall be sold within the space of three years. The same shall extend to the real and personal property of their royal highnesses the archduke Ferdinand, and the archduchess Beatrix his wife, which they possessed in the territory of the Cisalpine republic.

XVII. The 12th, 13th, 15th, 16th, 17th, and 18th articles of the treaty of Campo Formio shall be again in full force, to be executed according to their form and tenor, as if they were inserted verbatim in the present treaty.

XVIII. The contributions, levies, supplies of provisions and other supplies of war, shall cease from the date of the exchange of the ratifications of the present treaty, on the part of his majesty the emperor, and by the Germanic empire, and on the part of the French republic.

XIX. The present treaty shall be ratified by his majesty the emperor and king, by the empire, and by the French republic, within thirty days, or sooner if it can be done; and it is agreed upon that the armies of the two powers shall remain in the positions where they now are, both in Germany and Italy, until the said ratifications of the emperor and king, of the empire, and of the French republic, shall be at the same time exchanged at Luneville by the respective plenipotentiaries. It is also agreed upon, that ten days after the exchange of the said ratifications, the armies of his imperial and royal majesty shall re-enter his hereditary possessions, which shall in the same time be evacuated by the French armies; and that thirty days after the said exchange the French armies shall evacuate the whole of the territory of the said empire.

Done and signed at Luneville, the 20th Pluviose, 9th year of the French republic.....9th Feb. 1801.

LOUIS COUNT COBENTZEL.
JOSEPH BUONAPARTE.

No. II.

TREATY OF PEACE BETWEEN GREAT BRITAIN AND THE FRENCH REPUBLIC, CONCLUDED AT AMIENS, 27th MARCH 1802*.

ARTICLE I. THERE shall be peace, friendship, and good understanding between the French republic, his majesty the king of Spain his heirs and successors, and the Batavian Republic, on the one side, and his majesty the king of the United kingdom of Great Britain and Ireland, his heirs and successors, on the other part. The contracting parties shall use their utmost efforts to preserve a perfect harmony between their respective countries, without permitting any act of hostility whatever, by sea or by land, for any cause, or under any pretext. They shall carefully avoid every thing which might for the future disturb the happy union now re-established between them; and shall not give any succour or protection, directly or indirectly, to those who would wish to injure any one of them.

II. All the prisoners made on one side and the other, as well by land as by sea, and the hostages carried off or delivered up during the war, and to the present day, shall be restored without ransom, in six weeks at the latest, to be reckoned from the day on which the ratifications of the present treaty are exchanged; and on paying the debts which they shall have contracted during their captivity. Each of the contracting parties shall respectively discharge the advances which shall have been made by any of the contracting parties, for the support and maintenance of prisoners, in the countries where they have been detained. There shall be appointed, by mutual consent, for this purpose, a commission specially empowered to ascertain and determine the compensation which may be due to any one of the contracting parties. The time and the place shall likewise be fixed by mutual consent, for the meeting of the commissioners, who shall be entrusted with the execution of this article; and who shall take into account not only the expenses incurred on account of the prisoners of the respective nations, but likewise on account of the foreign troops who, before being taken, were in the pay, and at the disposal, of one of the contracting parties.

III. His Britannic majesty restores to the French Republic and its allies, viz. his catholic majesty and the Batavian republic, all the possessions and colonies which respectively belonged to them, and which have been either occupied or conquered by the British forces during the course of the present war, with the exception of the island of Trinidad, and of the Dutch possessions in the island of Ceylon.

IV. His Catholic majesty cedes and guarantees, in full property and sovereignty, the island of Trinidad to his Britannic majesty.

V. The Batavian republic cedes and guarantees, in full property and sovereignty, to his Britannic majesty all the possessions and establishments in the island of Ceylon, which previous to the war belonged to the republic of the United Provinces, or to the Dutch East India company.

VI. The port of the Cape of Good Hope remains to the Batavian republic, in full sovereignty, in the same manner as it did previous to the war. ....The ships of every kind belonging to the other contracting parties shall be allowed to enter the said port, and there to purchase what provisions they may stand in need of, as heretofore, without being liable to pay any other imposts than such as the Batavian republic compels the ships of its own nation to pay.

VII. The territories and possessions of her most faithful majesty are maintained in their integrity, such as they were antecedent to the war. Nevertheless, the boundaries of French and Portuguese Guiana are fixed by the river Arawari, which empties itself into the ocean above Cape North, near the islands Nuovo and Penetentia, about a degree and a third of north

* Translated from the French counterpart.

latitude. These boundaries shall run along the river Arawari, from its mouth the most distant from Cape North, to its source, and afterwards on a right line, drawn from that source to the Rio Branco towards the west. In consequence the northern bank of the river Arawari, from its most distant mouth to its source, and the territories that lie to the north of the line of the boundaries, laid down as above, shall belong in full sovereignty to the French republic. The southern bank of the said river, from the same mouth, and all the territories to the south of the said line, shall belong to her most faithful majesty.....The navigation of the river Arawari, along the whole of its course, shall be common to both nations.....The arrangements which have been agreed upon between the courts of Madrid and Lisbon, respecting the settlement of their boundaries in Europe, shall nevertheless be adhered to, conformably to the stipulations of the treaty of Badajoz*.

VIII. The territories, possessions, and rights of the Sublime Porte are maintained in their integrity, as they were before the war.

IX. The republic of the Seven Islands is recognised.

. The islands of Malta, Gozo, and Comino, shall be restored to the order of St. John of Jerusalem, to be held on the same conditions on which it possessed them before the war, and under the following stipulations:

1. The knights of the order, whose languages shall continue to subsist after the exchange of the ratification of the present treaty, are invited to return to Malta as soon as the exchange shall have taken place. They will there form a general chapter, and proceed to the election of a grand master, chosen from among the natives of the nation which preserve their language†, unless that election has been already made since the exchange of the preliminaries.....It is understood that an election made subsequent to that epoch shall alone be considered valid, to the exclusion of any other that may have taken place at any period prior to that epoch.

2. The governments of the French republic and of Great Britain, desiring to place the order and island of Malta in a state of entire independence, with respect to them, agree that there shall not be in future either a French or English language, and that no individual belonging to either the one or the other of these powers, shall be admitted into the order.

3. There shall be established a Maltese language, which shall be supported by the territorial revenues and commercial duties of the island. This language shall have its peculiar dignities, an establishment, and an hotel. Proofs of nobility shall not be necessary for the admission of knights of this language; and they shall moreover be admissible to all offices, and shall enjoy all privileges, in the same manner as the knights of the other languages. At least half of the municipal, administrative, civil, judicial, and other employments depending on the government, shall be filled by inhabitants of the islands of Malta, Gozo, and Comino.

4. The forces of his Britannic majesty shall evacuate the island and its dependencies within three months from the exchange of the ratifications, or sooner if possible. At that epoch

* By that treaty the small province of Olivenza was ceded to Spain, and the river Guadiana constituted the boundary between Spain and Portugal. By the treaty between France and Portugal, 29th September 1801, it was assumed "that the boundaries of French and Portuguese Guiana shall be determined in future by the river Carapanatuba, which flows into the river Amazon, about a third of a degree of north latitude above fort Macapa. These limits shall follow the course of the river to its source, whence they shall take a direction to the grand chain of mountains which divide the two rivers; they shall follow the windings of that chain to the point nearest to Rio Branco, between the second and third degree north of the equator."

In addition to the Spanish part of St. Domingo, it is rumoured that Louisiana is resigned to France.

† A language here signifies a right of election, as belonging to a particular catholic nation. Thus, in the Maltese form, the knights chosen in France were styled of the French language, &c.

it shall be given up to the order in its present state, provided the grand master or commissaries, fully authorised according to the statutes of the order, shall be in the island to take possession; and that the force which is to be provided by his Sicilian majesty, as is hereafter stipulated, shall have arrived there.

5. One half of the garrison at least shall be always composed of native Maltese; for the remainder the order may levy recruits in those countries only which continue to possess the languages (*posseder les langues*). The Maltese troops shall have Maltese officers. The command in chief of the garrison, as well as the nomination of the officers, shall pertain to the grand master; and this right he cannot resign, even temporarily, except in favour of a knight, and in concurrence with the advice of the council of the order.

6. The independence of the isles of Malta, of Goza, and Comino, as well as the present arrangement, shall be placed under the protection and guarantee of France, Great Britain, Austria, Spain, Russia, and Prussia.

7. The neutrality of the order, and of the island of Malta, with its dependencies, is proclaimed.

8. The ports of Malta shall be opened to the commerce and navigation of all nations, who shall there pay equal and moderate duties: these duties shall be applied to the cultivation of the Maltese language, as specified in paragraph 3; to that of the civil and military establishments of the island; as well as to that of a general *lazaretto*, open to all ensigns.

9. The states of Barbary are excepted from the conditions of the preceding paragraphs, until, by means of an arrangement to be procured by the contracting parties, the system of hostilities, which subsists between the states of Barbary and the order of St John, or the powers possessing the languages, or concurring in the composition of the order, shall have ceased.

10. The order shall be governed, both with respect to spirituals and temporals, by the same statutes which were in force when the knights left the isle, as far as the present treaty shall not derogate from them.

11. The regulations contained in the paragraphs 3, 5, 7, 8, and 10, shall be converted into laws and perpetual statutes of the order, in the customary manner: and the grand master, (or if he shall not be in the island at the time of its restoration to the order, his representative,) as well as his successors, shall be bound to take an oath for their punctual observance.

12. His Sicilian majesty shall be invited to furnish two thousand men, natives of his states, to serve in garrison of the different fortresses of the said islands. That force shall remain one year, to bear date from their restitution to the knights; and if at the expiration of this term, the order should not have raised a force sufficient, in the judgment of the guaranteeing powers, to garrison the island and its dependencies, such as is specified in the paragraph, the Neapolitan troops shall continue there until they shall be replaced by a force deemed sufficient by the said powers.

13. The different powers designated in the 6th paragraph, viz. France, Great Britain, Austria, Spain, Russia, and Prussia, shall be invited to accede to the present stipulations.

XI. The French troops shall evacuate the kingdom of Naples and the Roman states; the English forces shall also evacuate Porto Ferrajo, and generally all the ports and islands which they occupy in the Mediterranean, or the Adriatic.

XII. The evacuations, cessions, and restitutions, stipulated by the present treaty, shall be executed in Europe within a month; on the continent and seas of America and Africa, in three months; on the continent and seas of Asia, in the six months which shall follow the ratification of the present definitive treaty; except in case of a special reservation.

XIII. In all cases of restitution agreed upon by the present treaty, the fortifications shall be restored in the condition they were in at the time of signing the preliminaries; and all the works which shall have been constructed since their occupation, shall remain untouched. It is agreed besides, that in all the stipulated cases of cessions, there shall be allowed to the inhabitants, of whatever rank or

nation they may be, a term of three years, reckoning from the ratification of the present treaty, to dispose of all their properties, whether acquired or possessed by them, before or during the continuance of the present war; during which term of three years they shall have free and entire liberty to exercise their religion, and to enjoy their fortunes. The same power is granted in the countries that are hereby restored, to all persons, whether inhabitants or not, who shall have formed any establishments there during the time that those countries were in the possession of Great Britain..... as to the inhabitants of the countries restored or ceded, it is hereby agreed that no person shall, under any pretence, be prosecuted, disturbed, or molested, either in person or property on account of his political conduct or opinion, or for his attachment to any of the contracting parties, on any account whatever, except debts contracted with individuals, or for acts subsequent to the present treaty.

XIV. All the sequestrations laid on either side, upon funds, revenues, and credits, of what nature soever they may be, belonging to any of the contracting powers, or to their citizens or subjects, shall be taken off immediately after the signature of this definitive treaty. The decision of all claims among the individuals of the respective nations, for debts, property, effects, or rights of any nature whatsoever, which should, according to received usages and the law of nations, be produced at the epoch of the peace, shall be referred to the competent tribunals; in all those cases speedy and complete justice shall be done in the countries wherein those claims shall be respectively preferred.

XV. The fisheries on the coast of Newfoundland and of the adjacent islands, and in the gulf of St. Lawrence, are replaced on the same footing as they were before the war. The French fishermen of Newfoundland, and the inhabitants of the islands of St. Pierre and Miquelon, shall have liberty to cut such wood as may be necessary for them in the bays of Fortune and Despair, during one year, reckoning from the ratification of the present treaty.

XVI. To prevent all grounds of complaint and disputes which might arise on account of captures which may have been made at sea subsequent to the signing of the preliminaries, it is reciprocally agreed that the ships and property which may have been taken in the Channel and in the North Seas, after a space of twelve days, reckoning from the exchange of the ratifications of the preliminary articles, shall be restored on the one side and the other; that the term shall be one month for the space from the Channel and the North Seas as far as the Canary Islands inclusively, as well in the Ocean as in the Mediterranean; two months from the Canary Islands to the Equator; and finally, five months in all the other parts of the world, without any further exception or distinction of time or place.

XVII. The ambassadors, ministers, and other agents of the contracting powers, shall enjoy respectively in the states of the said powers, the same rank, privileges, prerogatives, and immunities, which were enjoyed before the war by agents of the same class.

XVIII. The branch of the house of Nassau, which was established in the ci-devant republic of the United Provinces, now the Batavian republic, having experienced some losses, as well with respect to private property as by the change of constitution adopted in those countries, an equivalent compensation shall be procured for the losses which it shall be proved to have sustained.

XIX. The present definitive treaty of peace is declared common to the Sublime Ottoman Porte, the ally of his Britannic majesty; and the Sublime Porte shall be invited to transmit its act of accession as soon as possible.

XX. It is agreed that the contracting parties, upon requisitions made by them respectively, or by their ministers or officers duly authorised for that purpose, shall be bound to deliver up to justice persons accused of murder, forgery, or fraudulent bankruptcy, committed within the jurisdiction of the requiring party, provided that this shall only be done in cases in which the evidence of the crime shall be such, that the laws of the place, in which the accused person shall be discovered, would have authorised the detaining and bringing him to trial

had the offence been committed there. The expenses of the arrest and the prosecution shall be defrayed by the party making the requisition; but it is understood that this article has no sort of reference to crimes of murder, forgery, or fraudulent bankruptcy committed before the conclusion of this definitive treaty.

XXI. The contracting parties promise to observe, sincerely and faithfully, all the articles contained in the present treaty; and will not suffer any sort of counteraction, direct or indirect, to be made to it by their citizens, or respective subjects. And the contracting parties guarantee, generally and reciprocally, all the stipulations of the present treaty.

XXII. The present treaty shall be ratified by the contracting parties within the space of thirty days, or sooner if possible; and the ratifications shall be exchanged in due form at Paris.

In testimony whereof we, the undersigned plenipotentaries, have signed with our hands, and in virtue of our respective full powers, the present definitive treaty, causing it to be sealed with our respective seals.

Done at Amiens, the 6th Germinal in the year 10, (March 27, 1802.)

(Signed) J. Buonaparte.
Cornwallis.
Azara.
Schimmelpenninck.

No. III.

REMARKS ON THE RUSSIAN AND SPANISH PRONUNCIATION, &c*.

THE confusion so frequently met with in books and maps, from the mode of expressing Russian proper names, arises principally, if not entirely, when otherwise any degree of accuracy is attended to, from this circumstance: The Germans render the third letter of the Russian alphabet, *vedi*, which is precisely the Latin or English v †, by their w, as having the same sound; pronouncing *was wollen wie*, as we should *vas vollen vie*; and accordingly, on their first coming to England, they naturally say, *vat vould ve* instead of *what would we*. Now it is well known that most of the maps and books concerning the geography or history of Russia, used in France and England, are translated from the German; in which the translators, adhering strictly to the letter of *their* original, render the words, especially in our language, (for the French having no w may give it what sound they please,) totally different. What a different sound, for instance, in English have *Mobilew, Tambow, Tschernigow, Charkow, Okzakow, Saratow, Kiow, Wolga, Newa, Newski, Orlow, Dashkow*, &c. from *Mobilef, Tambof, Chernigof, Kharkof, Otchakof, Saratof, Kief, Volga, Neva, Nefski, Orlof, Dashkof*, &c. as they are spelt and pronounced in Russian. The Rev. Mr. Smirnove prefers rendering this termination by *owe, Tambove, Chernigove, Dashkove, Orlove*, &c.; and his opinion ought to have great weight, as that of a gentleman acquainted with both languages. However the difference between us is nearly if not quite none at all; and I adopted the *of*, after the Rev. Mr. Coxe, and many other respectable names, only for the sake of simplification, and because to my ear it is the better English termination of the two. At any rate the totally different German orthography ought to be forever exploded from all English maps and writings.—The Polish and Hungarian *c* and *z*, copied by the Germans, have likewise, in an inferior degree, added to the perplexities: *czar* for *tzar*, *Czernichew* for *Chernichef*, *czarowitz* for *tzarevitch*, *Petrowitz* for *Petrovitch*, &c.

The following are a few geographical terms:

Ocean....*Okeàne.*

Sea....*Moré*; *Tikoë moré*, the peaceable or pacific sea.

Tchernoë moré, the black sea.

Sredizemnie moré, the midland sea; Mediterranean.

Lake....*Ozero*; *Bielo-ozero*, the white sea: *Ladogskoi ozero*, the Ladoga lake.

Cape or promontory....*Noss*, signifying likewise the nose; as does the *Nase* of Norway.

Strait....*Prolife*; *Veygatskoi proliva*, Veigat's straits.

Gulf....*Zalife*; Bay....*Zalife*; Creek....*Zalife*; } *Zaliva Phinskago*, the gulf of Finland. Only one word for them all.

River....*Reka.*

Mountain....*Gora.*

Hill....*Gorka*, the diminutive of *Gora.*

Valley....*Dolina.*

Forest....*Less* (pron. *Lyess.*)

Desert....*Pustyi.*

Plain....*Dolina*: also *Rovnina*, and *Glade.*

Peninsula....*Poluostrof.*

Island....*Ostrof.*

Rock....*Kamen.*

City....*Gorod*; *Novgorod*, New city; *Staragorod*, or *Bohem Stargard*, Old city.

Town....*Gorodok*, the diminutive of the foregoing.

Nation or country....*Narode.*

Native country....*Rodina*, or *Otèchestvo.*

Region ...*Strana.*

Kingdom....*Korolevstvo.*

King....*Korol.*

* For those on the Russian, the author is indebted to the Rev. Mr. Tooke.

† Or *f* in the word *of*, e. g. coat of arms; man of war, &c. where the *f* is neither more nor less than a v.

Climate....*Klimatt* (evidently borrowed.)
Earth....*Zemla*, (pron. *Zeml-ya*,) *Novazemla*, New earth; like Newfoundland.
World....*Svet*, (pron. *Sv-yet*.)
Province....*Provintzia*, or *Guberniya*.
Territory; district....*Uyesd*; *oblast*.
Isthmus....*Istm*, also *pereesheek*.
Sound....*Sund*: *Nutka-sund*.
Volcano....*Ogneduischutschaia gora*, (burning mountain.)
Whirlpool....*Puchina*.
Haven....*Gavane*.
Port..... } The same.
Harbour.... }

From Mr. Tooke's information it likewise appears that the common termination *skoy* is merely an adjective possessive or appellative; as *Finskoy*, Finnish; *Imperatorskoy*, Imperial, &c.: So the Aleutskoi, the Aleutain islands, &c.

A few remarks may also be offered on the Spanish pronunciation, from Dobrizhoffer and others.

Ch is pronounced as the German *tsch* (or *ch* in our *church*;) so *muchè*, *Chili*, are *mutschо*, *Tschili*.

X and *J* are sounded gutturally like *h*; as *mujer*, *muher*; *jamas*, *hamas*; *Ximenez*, *Himenez*. In the sound of *x* our author seems to err, for it is uniformly put by the Spanish, in expressing foreign words, as *sh*; thus *Xab* is *Shab*; *Xoa* is *Shoa*; *Xerez* is *Sherez*, &c. &c. The sound of *x* as a mere *h* seems a provincialism, or a recent affectation.

ç is precisely equal to *z*.
Ll as *li*; thus *colmillo*, *colmilio*.
ñ as *gn* in French; *España*; *Espannia*.
qu as *k*.

Link and his ingenious translator, present some remarks on the Portuguese pronunciation. The Portuguese do not use the *i* after *t*, &c. as *tierra*, *terra*. The *ch* is pronounced as in French; and both the *j* and the *x* like the French *j*. The final *aõ* is sounded *aung*; and the final *m*, which is frequent, like *ng*. The *n* between two vowels is changed to *nb*; thus *vino* becomes *vinbo*, pronounced *veenyo*. The Portuguese is averse to the *l*; hence the articles *lo*, *la*, become simply *o*, *a*, this *o* being pronounced as *u*.

NO. IV. VALUE OF COINS USED IN COMMON CALCULATIONS.

	French Money. Frs.	Cts.	*Sterling.* £	s.	d.
Florin of Germany,	2	20	0	1	10
.....Austria, -	2	65	0	2	2
Rix dollar of Prussia,	4	—	0	3	4
Dollar of N. America,	5	40	0	4	6
Guinea of England,	25	—	1	1	0
Rix dollar of Den.	5	70	0	4	9
Piastre of Spain, -	5	30	0	4	5
Florin of Holland,	2	20	0	1	10
Lire of Italy, -	—	85	0	0	8½
Scudi of Rome, -	5	53	0	4	7

	French Money. Frs.	Cts.	*Sterling.* £	s.	d.
Ducat of Naples*,	4	30	0	3	7
Rouble of Russia, -	4	5	0	3	4½
Rix dollar of Sweden,	5	80	0	4	10

The common large tables of coins are not only uselessly prolix, by including those never mentioned in books of history or travels, but present many antiquated names and values, and are in other respects often grossly erroneous.

* A German ducat is about 9s. 4d. the dollar 4s. 8d.

END OF VOL. I.

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